DECEMBER 21, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

FOREIGN ROUNDUP No. 3

Workers Won't Repudiate the Union In NLRB Vote on the Steel Offer

Fringe Benefit Costs Climb Higher

1960 Export Outlook: Metalworkers Will Fight Hard for Small Gains

Aluminum Containers Beat the Cold

Try Shot Peening Stainless Steel To Cut Stress Corrosion Problems

Galvanized Sheets Set for Record '60

Russia's Trade Challenge

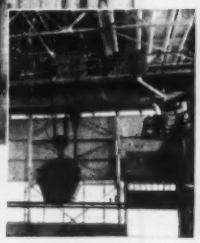
Soviet leaders desperately want to outproduce American industry. Their gross national product is growing faster than ours. The outlook: War on the economic front will get hotter—see Page 54

METALWORKING OUTLOOK
PAGE 41

COMPLETE CONTENTS
TURN PAGE

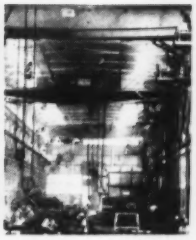
Pulling pattern from mold for 12-ton casting

EASY UP does it!



Handling sandslinger sand bucket

Spotting 15-ton casting on flat-car for inter-plant transportation



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with A-C power and big assist from

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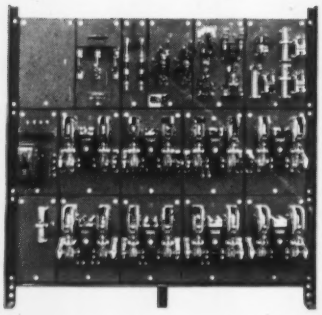
Hoist Control and Frequency Relay Acceleration



• Here's another example of preference for EC&M *Engineered* Crane Control for industry's tough and critical handling jobs. For its new foundry, The Bullard Company, large eastern machine tool builder, selected EC&M Control for 11 new cranes powered by A-C motors. A thorough study of EC&M apparatus and engineering showed that EC&M circuits were the safest, simplest, and that speed-torque curves of EC&M's EDDYMAG Hoist Control were the finest available. Acceleration by the EC&M Frequency Relay Method was another plus value.

You're ahead in more ways than one when you specify EC&M Control for cranes

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

7735

This Week in STEEL

The Metalworking Weekly

December 21, 1959 Vol. 145—No. 25

Metalworking Outlook, Page 41

The Editor's Views—Everyone's Strike 47
▶ Workers Won't Repudiate Union in NLRB Vote on Steel Offer 49
▶ Fringe Benefit Costs Climb Higher—Up 7.9 cents since '57 50
How Three Western Nations Prevent Major Walkouts 50
Manufacturers Plan Increased Capital Spending in 1960 51
Handling Equipment Makers Predict 10 Per Cent Sales Gain .. 52
Grate-Kiln Lines Will Upgrade Iron Ore—Humboldt expanding 53
▶ Russia's Challenge: "We'll Win in the Market Place" 54
No. 3 in a series of foreign roundups on metalworking
Welding Electrode Market Rebounds—Producers report gains 61
▶ Export Markets Harder to Crack—Push planned for 1960 ... 64
Bliss Incorporates Many New Features in Presses 81

Technical Outlook, Page 85

▶ Aluminum Beats the Cold—Used for storing liquefied gases .. 86
▶ Peening Cuts Stress Corrosion—Tests made on stainless 88
New Glass Staves Off Hot Acids, Alkalies 89
Tests Show that Rene 41 Can Be Welded, Machined 90
Change in Specifications Raises Lift Truck Capacity 91
Machine Shapes Giant Missile Cases—Flow turning is used 92
Progress in Steelmaking—Modified H-Iron Process Produces Metal Powder—Plant rated at 18,000 tons a year 94
Material Switch Leads to Price Cut—Cost crisis entry 99
Retort Brazing Turns Out High Strength Honeycombs 100
Plastic Design Cuts Construction Costs—Saves on steel 101
Vertical Cut Grinder Handles Tricky Curves 101

Market Outlook, Page 111

Complete Index to Market News and Prices 111
▶ Galvanizers Set for Record 1960—Sheet shortage may continue 113
Some Import Steel Prices Rise but Others Decline 115
Ohio Ferro-Alloys Raises Some Ferrochrome Prices 117
Steelworks Operation Chart and District Ingot Rates 120
Steel Production Jumps Sharply During November 120
Scrap Prices Drop $1.50—Composite goes to $41.33 132
Nonferrous Metals—Confusion in Cuba 136

▶ Articles listed on cover.

WHERE TO FIND

Metalworking Pulse. Turn Page		The Business Trend	71
STEEL Servicenter	5	Men of Industry	75
Calendar of Meetings ...	10	Obituries	78
Editorial & Business Staffs	16	New Products	103
Windows of Washington .	58	New Literature	108
Mirrors of Motordom	67	Advertising Index	141

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED DEC. 12	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	175†	167	134	158

†Preliminary.

Weekly records in production of both steel and electric power resulted in an all-time high mark for STEEL's industrial production index in the week ended Dec. 12. With the help of increased auto production, another record is not far off.

Details on Page 71

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED DEC. 19	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled	105,000*	85,638†	68,476	135,964

(Source: Ward's Automotive Reports.) *Estimated. †Preliminary.

Last week, auto producers were scheduled to break the 100,000 unit a week mark for the first time since late October. Unless steel supplies are cut off again, the rise should be continuous until well into the first quarter when output could reach an all-time peak.

Details on Page 68

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED DEC. 20	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	2,732*	2,732	2,233	2,011
Index (1947-49=100)	170.1*	170.1	139.0	125.2
Percentage of capacity	96.5*	96.5	78.9	74.5

*Estimated by STEEL; comparative figures reported by AISI.

All steelmaking districts report operating rates of 90 per cent or higher with the national figure holding at 96.5 per cent, maintaining all-time peak tonnage. High: St. Louis at 105.5 per cent. Low: Birmingham at 86.5.

Details on Page 120

STEEL SCRAP PRICE COMPOSITE

	DEC. 16	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$41.33	$42.83	$44.83	$39.17

Delay in placement of large tonnage orders by mills has weakened the market for steelmaking grades of scrap. No. 1 heavy melting declined $3 a ton at Philadelphia and $1.50 a ton at Chicago.

Details on Page 132

FINISHED STEEL PRICE INDEX

	DEC. 15	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.8	186.9

The price on imported steel products is mixed. Some items, including sheets, are higher on strong demand. A few, including some bar and wire products, are lower due to less demand pressure.

Details on Page 121

It's a personal letter... but we'd like everyone to know how we feel about **STEEL SERVICE CENTERS**

STEEL SERVICE CENTER INSTITUTE

Bethlehem Steel Company
(INCORPORATED)

J. V. HONEYCUTT
Vice President

Bethlehem, Pa.

December 3, 1959

Mr. Robert G. Welch
Executive Vice President
Steel Service Center Institute
540 Terminal Tower
Cleveland 13, Ohio

Dear Bob:

As you well know, I have made a practice for years of keeping in close contact with your Association and of following with great interest the part played by my many friends in the various Steel Service Centers who comprise your membership.

Frankly, other than in wars, I don't know of any period where the results of their foresight, investment, and other policies have been of more benefit to our economy and our people than during the present critical steel situation. Many times I've had to listen to theorists in high places argue about the value of these Service Centers (and you know where!), but there could be no more conclusive proof than to look at the broad list of companies helped by the Steel Service Centers all over the country to continue their operations, thereby employing many people which they otherwise couldn't have done during recent weeks.

Today, it is impossible for any one to foresee the ultimate solution to our present problem, but one thing of which I am sure is that your membership has again deserved the spotlight focused on the contributions they have made to the welfare of our country and on the importance of their role in the steel business. This should be very gratifying to you and to each of them, as I can assure you it is to me.

Best personal regards.

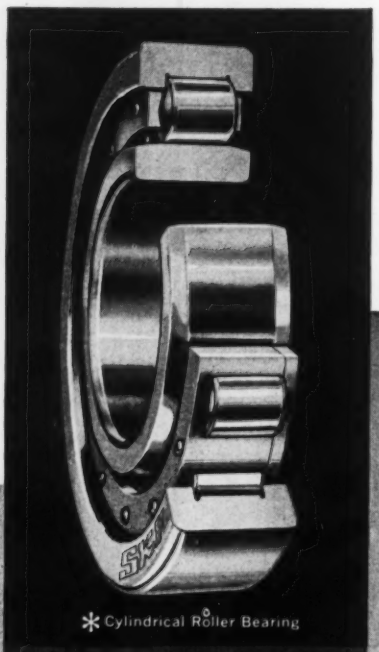
Yours sincerely,

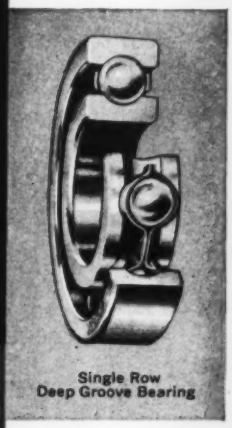
J. V. Honeycutt
Vice President

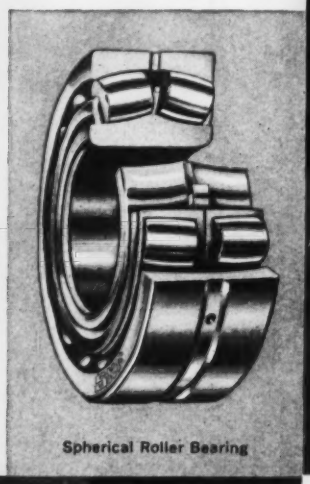
JVH:ds

BETHLEHEM STEEL

What's "special" about these standard SKF bearings?







They all have exclusive features. Where else, for example, can you get the 33⅓% higher capacity available in standard SKF spherical roller bearings?

*Or, take the cylindrical roller bearing. This type provides high radial capacity and minimum shaft friction. Controlled shaft end float within the bearing is a natural advantage of this design.

Yet this is SKF's standard cylindrical roller bearing, promptly available in 154 sizes ranging from just under 1" to 6" (bore). In the double row it's 1" to 9.5".

Why not get the complete facts on these "special" but standard (and economical) bearings? For details, call any of the 25 SKF sales offices today. 5923

Spherical, Cylindrical, Ball, and Tyson *Tapered Roller Bearings*

EVERY TYPE—EVERY USE

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SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

*REG. U. S. PAT. OFF.

thermal thicket

Problem: *The heat barrier which now hinders hypersonic aircraft and missiles.*

Needed: *Dependable high temperature alloys for structural components.*

Solution: *Find the right alloys that are easy to forge and machine and are truly uniform.*

Source: *Predictable performance Carpenter alloys made by the exclusive Mel-Trol, VacuMeltrol and Consumet melting processes.*

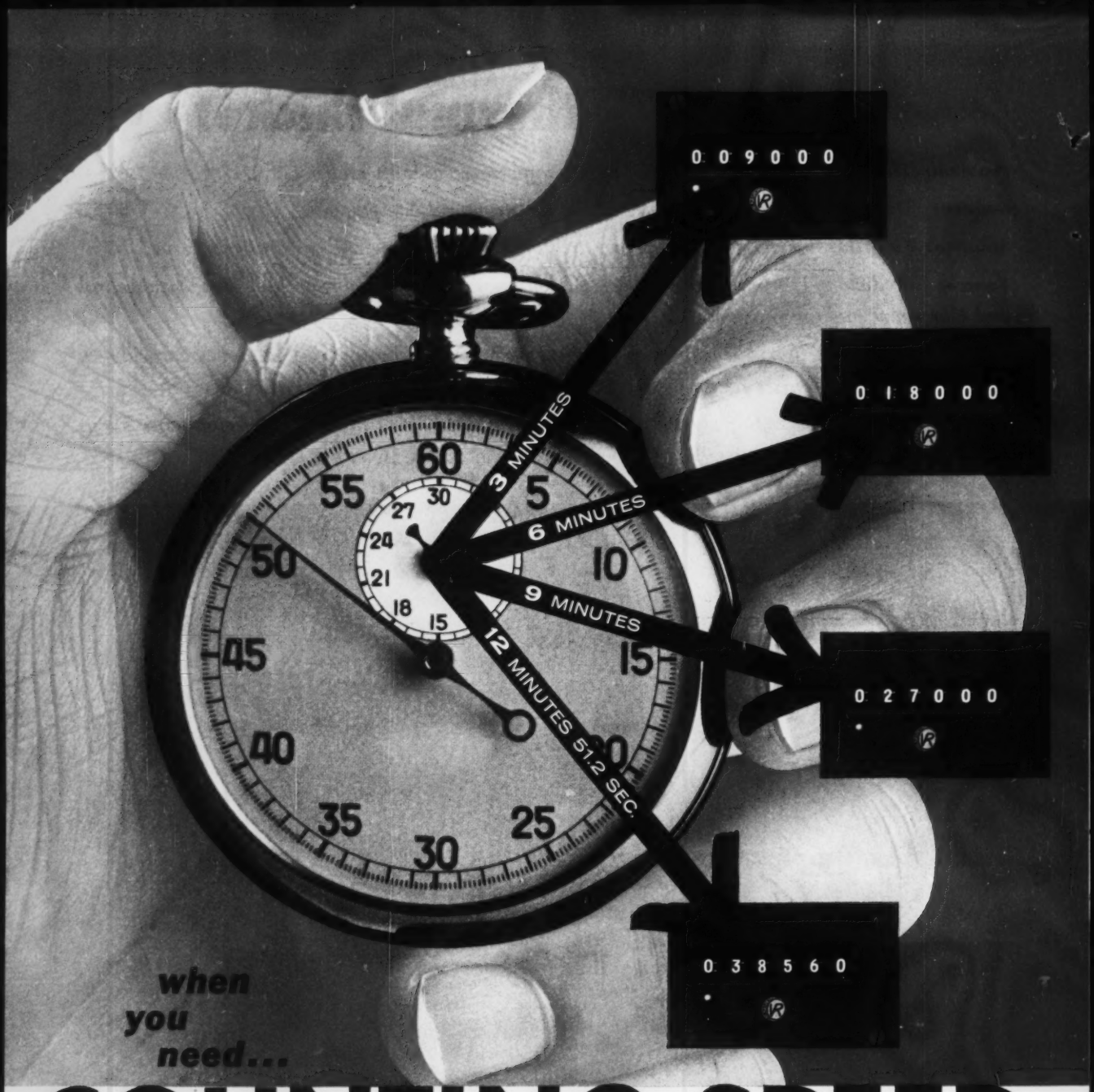
Engine builders find them ideal for many critical parts. Forge shops report improved forgeability resulting in better finishes requiring far less machining. Work goes faster. Rejects are fewer.

Call your local Carpenter Representative for the whole story about predictable performance alloys and how they can benefit you. The Carpenter Steel Company, Reading, Pa.

a new company 70 years old

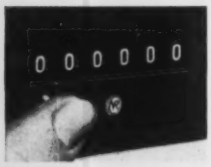
Carpenter steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.



COUNTING SPEED

Specify VEEDER-ROOT No. 1591 Quick Reset, High Speed Magnetic Counter



The No. 1591 resets to zero with the flick of a finger with manual reset, or in one second with electrical reset.

The No. 1591 is designed for accurate, dependable remote indication of machine operation, or for counting articles at high speed. Speed is 3000 counts per minute, 4 or 6 figures, manual or electrical reset, and made for panel mounting. Maximum panel area required is: 1.7″ x 2.1″ for four figures and 1.7″ x 2.8″ for six figures. The 1591 is *available from stock.*

Send for Veeder-Root Technical Information. Complete catalog data will be sent to you at once and application assistance is available from a Veeder-Root Counting Engineer if desired. Write or call today.

Veeder-Root Inc.
HARTFORD 2, CONNECTICUT
"The Name that Counts"

Hartford, Conn. • Greenville, S. C.
Altoona, Pa. • Chicago • New York
Los Angeles • San Francisco • Seattle
St. Louis • Montreal. *Offices and Agents in other principal cities*

MERRY CHRISTMAS

STEEL Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

December 21, 1959

In Case of Fire, Open File

In the Nov. 9 Servicenter, we noted that the Army had developed a new chemical for fighting liquid fuel and electrical fires: Monobromotrifluoromethane, no less.

On Nov. 12 we got a nice letter from the supervising attorney, chief, Legal Office, Engineer Research & Development Laboratories, Corps of Engineers, U. S. Army, Fort Belvoir, Va. After reading that awe inspiring title, and some 200 words, we learned the government wanted to reproduce the Servicenter item as a technical reference for its project engineers.

We proudly signed the release forms (two copies), then this vision came into focus: Some day an Army scientist is going to delve into that file and find this advice: ". . . if you have a fire, holler for an extinguisher instead of: 'Quick! Bring the monobromotrifluoromethane!' "

Where the Day Goes

That government snafu puts us in mind of the adjacent cartoon from the American Management Association's book, *The Embattled Executive*. "Red tape. Watch your protocol: Check with your friends, enemies, and the man who used to hold your job. Send carbons to the controller, the assistant vice presidents, and the plant superintendent at Santa Fe. Phone the Washington bureau to check on Internal Revenue's probable reaction. Those ribbons of red tape may seem frail, but they've strangled far stronger men."

How to Insure Promptness

Irene Kasner, our Editorial Service gal (an avid angler) was featured in the Sept. 21 Servicenter. She received this letter from V. Narayan, Mukand Iron & Steel Works Ltd., Bombay, India:

"It was a pleasure, on reading the Sept, 21 issue of STEEL, p. 5, to know to whom we are indebted for quick supplies of article tearsheets.

"We, at Mukand, are not quite sure our requests rate as the classic described, but we would like to assure you that we shall be careful in giving the details (quantity, title, issue, and page) that will lessen your chores.

"Although our acquaintance with a guy named Izaak Walton isn't what it used to be, nor our knowledge of a dry fly (sherry or otherwise) so intimate, it's plain as a pike (staff) that you've got us hooked through the gills."

Falcon

Galaxie

Station Wagon

Thunderbird

Have You Beat-the-Experts?

Here are four cars in Ford Div.'s line of 19—and any one of the 19 can be yours to use for two weeks.

All you do is estimate the number of U. S. passenger cars that will be built in the first six months of 1960. The person who comes the closest to the production figure will win use of the car of his choice.

Five runners-up in the contest will walk off with full color prints of a dream car conceived and created expressly for the contest by Virgil M. Exner, vice president and director of styling, Chrysler Corp.

The contest ends at midnight, Dec. 31. Beat the Christmas rush—as well as the experts—get your entry in today.

Away from the Regular Grind

Are your employees taking extended coffee breaks? Versatile Tool Co., West Springfield, Mass., may have a solution for you. The company is marketing a Versatimer that accurately times coffee breaks. You simply set a timer for the length of break desired, press a button, and a buzzer sounds, signifying the start of the break. At the end of the break, the buzzer is triggered automatically.

It's lightweight, has no plugs, and no installa-

I believe _____ automobiles will be produced in the U. S. from Jan. 1 through June 30, 1960.

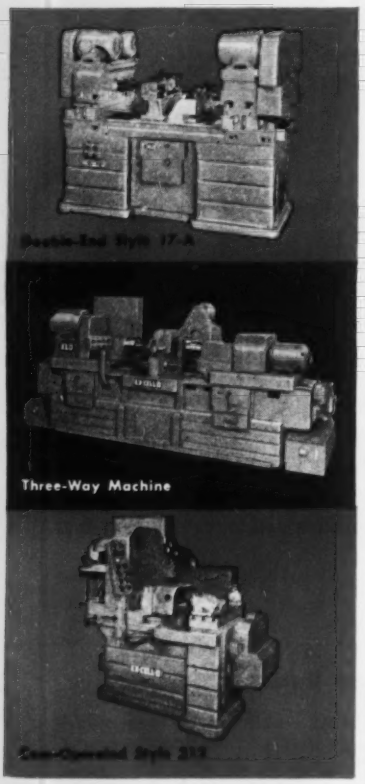
Mail this to:
Beat-the-Experts
STEEL
Penton Bldg.
Cleveland 13,
Ohio

PRINT NAME _____
POSITION _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____

INSTRUMENT PARTS OR HEAVY CASTINGS, SHORT RUNS OR MILLION-LOT ORDERS . . .

AN EX-CELL-O PRECISION BORING MACHINE FOR EVERY NEED

Ex-Cell-O Precision Boring Machines do more jobs, more accurately—Rough, semi-finish and finish Boring • Facing • Turning • Chamfering • Grooving • Taper-boring • Gun-drilling • Contouring



The Ex-Cell-O Catalog lists a wide range of standard Precision Boring Machines that meet your requirements for accuracy, speed, economy and dependability. Or call your local Ex-Cell-O Representative for details on hydraulic-actuated or cam-operated boring machines, single or double-bridge, horizontal or vertical styles, way-type machines and others in the complete line.

XLO EX-CELL-O FOR PRECISION

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN 59-40

tion is required. It might make a novel Christmas gift for negligent coffee quaffers.

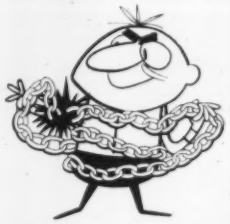
The Big Payoff

"How much would you invest in a program that promised to add 1 per cent to your profit margin?" That intriguing question in our Nov. 30 article, "Standardization Pays Off Big," brought this reply from L. J. Berlik, process engineer, Airguide Instrument Co., Chicago:

"Are there any outlines or general instructions available for instituting this type of program in a medium size plant?"

We suggest you write to G. F. Hussey Jr., managing director, American Standards Association, 70 E. 45th St., New York 17, N. Y.

Experiment in Management



Is your plant superintendent shackled with too many problem solving tasks? Next week, take a look at Assistant Editor Bill Olds's article on what General Electric Co. did at its Large Steam Turbine - Generator Dept., Schenectady, N. Y. The company reorganized supervision to meet problems at the first level instead of the superintendent level.

There are now 12 managers of shop operations (MSO) and each is responsible for all facets of his operation, including production, scheduling, methods, manufacturing costs, personnel and labor relations, and records.

The increased stature of the MSO has made just about everyone happy—workers, service groups, and management people are benefiting—and the improvement in cost and production figures proves the formula's success.

A Hard Nosed Brother

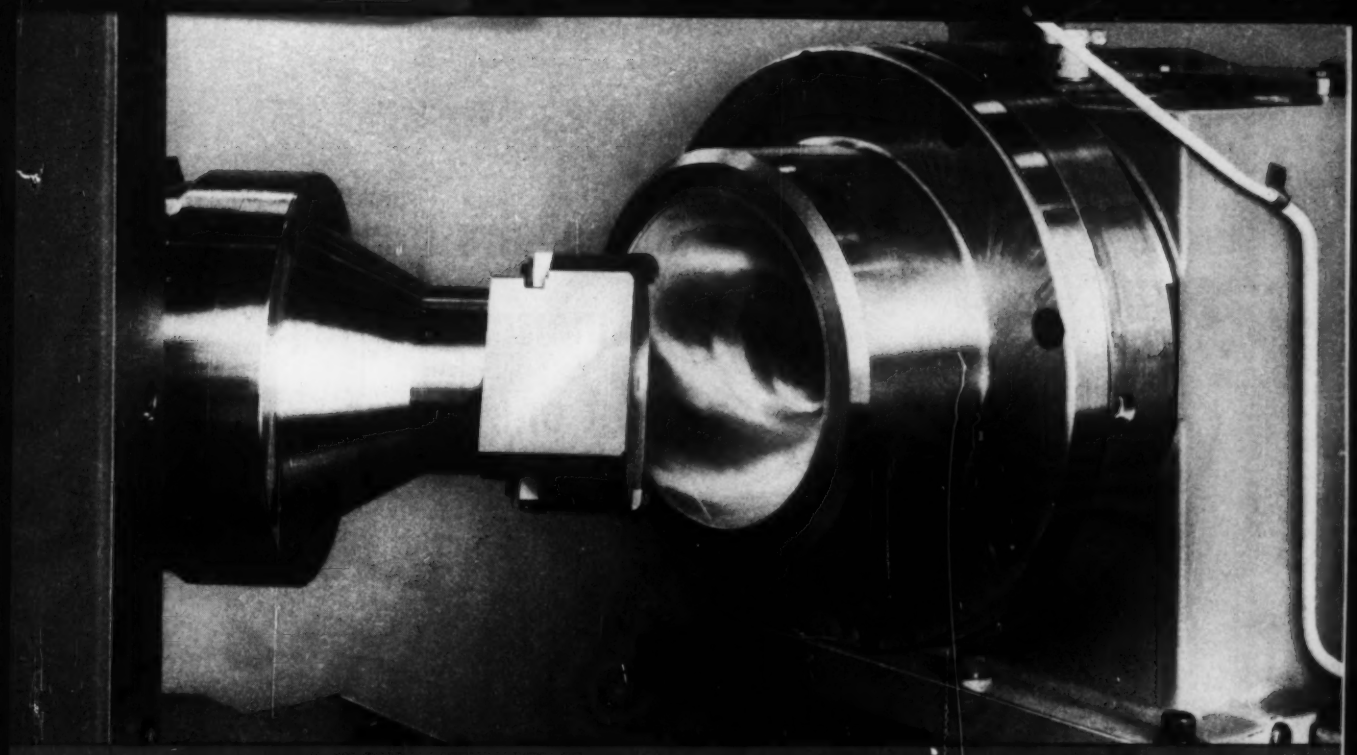
In our Dec. 7 issue, p. 96, Wyman-Gordon Co., Worcester, Mass., made some high-flying claims for a rare, high temperature superalloy, Astroloy. It's a hard nosed brother to General Electric's Rene 41, considered by aircraft producers to be one tough metal.

In tracking down story data, our editors talked with Cleveland representatives of several leading high temperature alloy producers.

One fellow said, after a lengthy record search: "I'm convinced this metal isn't available. I've just looked all through STEEL's Metal Selector and Astroloy isn't listed."

See the Technical Outlook (p. 85) in this issue for the Astroloy addition to your Metal Selector.

Any other newborn to report?



EX-CELL-O CUSTOM TURNING MACHINE MEETS DEMAND WITH PERFORMANCE

WORK: Rough and finish turning of I.D. and O.D. with automatic cycling between loads.

ACCURACY: Less than .0001" tolerance on radii and .0001" on total wall thickness. Surface finish to 10 rms.

MATERIAL: Wrought or forged annealed aluminum hemispheres, 6" to 16" dia.

Custom-equipped with gages, spindle tachometers and other features, hemisphere-turning machine is a job-tailored "special"—yet it is designed to accommodate future production changeover.

59-34

Here are just a few of the reasons why this special Ex-Cell-O Turning Machine meets demand with *precision performance*—every time:

An extremely accurate and rigid work spindle helps slim-down the hemispheres shown at a rate of 15 cu. in. per minute with a 1/8" cut. Separate variable-speed hydraulic motors give cutter speeds from 50 rpm to 2500 rpm, and work spindle speeds from 1/18 rpm to 4 rpm. Dial gages provide constant checks on work spindle slide and cutter plunge depth. Vacuum chucks hold the work securely, and full electrical interlocking protects operator and machine during production.

Perhaps a similar Ex-Cell-O special machine—designed to handle future work as well—is the answer to a production problem in your operation. Call your Ex-Cell-O Representative, or write direct for full details.

PRECISION FOR EX-CELL-O (XLO)

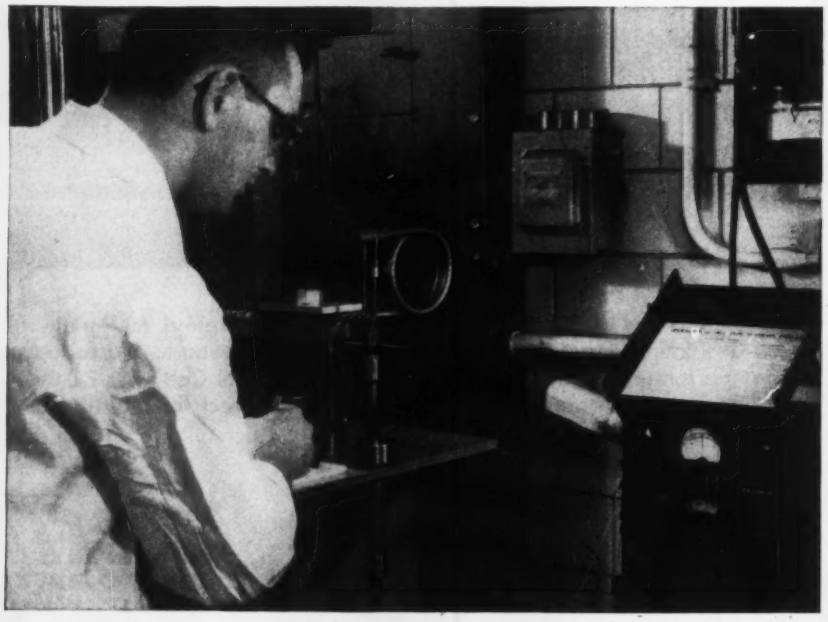
EX-CELL-O CORPORATION *Machinery Division*
DETROIT 32, MICHIGAN

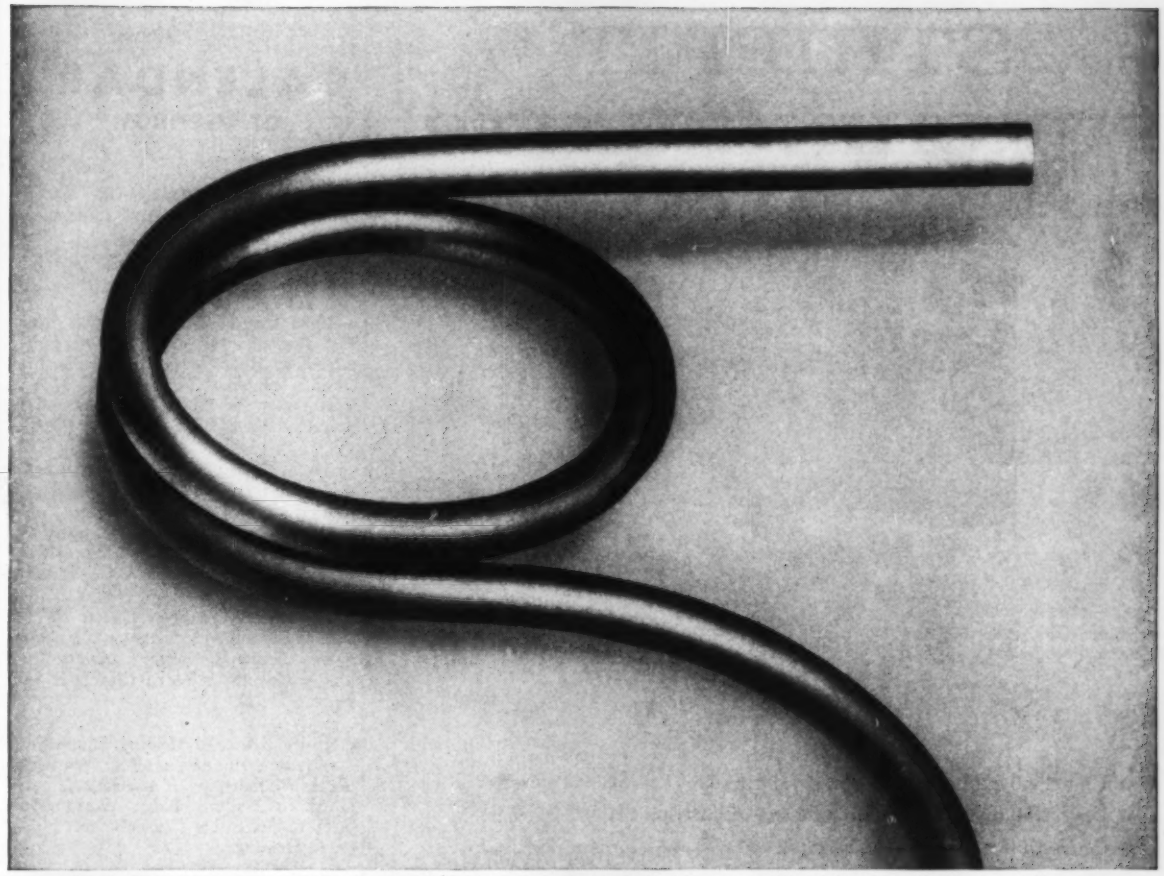
EX-CELL-O PRECISION PRODUCTS INCLUDE: MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • THREAD AND GROOVE GAGES • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

20,000 chairs rock on USS American Springs without one failure

...thanks to AS&W

In the American Steel & Wire Spring Testing Laboratory, the springs recommended for the Homecrest Chair go through extensive tests. This Fatigue machine, by means of strain-gauge verification, simulates years of use in a relatively short testing time.





Here is the spring recommended by American Steel & Wire for use in this chair. To supplement the AS&W tests, the Homecrest Company subjected these springs to a simulated rocking test. Under a weight of 250 pounds, these springs were rocked 750,000 times, without failure.

Spring Engineering Research Service

The Homecrest Company, Wadena, Minnesota, wanted to add a swivel rocking chair to their line of modern, functional home furniture. However, they would produce this chair only if it could be a quality item that would give good, dependable service. While designing the chair, they checked with the American Steel & Wire Spring Engineering Consulting Service. The engineers studied the problem, ran extensive tests and finally recommended a pair of round wire helical single coil torsion springs. Using these springs, Homecrest designed, fabricated and marketed the chair. Today 20,000 of these chairs have been sold and not one failure of an AS&W Spring has been reported.

Mr. A. L. Englemann, a partner of Homecrest Company, says, "We have purchased from American Steel & Wire over 45,000 springs, and not one has been reported a failure. We couldn't be happier with American Steel & Wire as a supply source for our springs."

If you have a spring problem, or would like advice on the use of springs in your product, get in touch with any American Steel & Wire Sales Office. You can benefit from the knowledge of AS&W's Spring Engineering Research Service. The Service has been engaged in laboratory experiments of static and dynamic testing for 20 years and has accumulated invaluable data on stress and fatigue life of steel springs, while endeavoring to improve efficiency in the use of steels, from steel chemistry through product application, to more economically cope with today's rigorous demands. This accumulated knowledge of the AS&W Spring Engineering Research Service is at your disposal. *American Steel & Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio.*

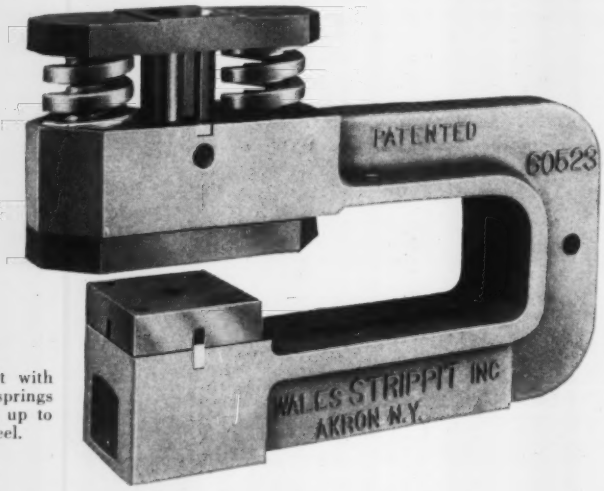
USS and American are registered trademarks

American Steel & Wire Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, Distributors Abroad

new STRIPPIT PUNCHING UNITS

with DUAL-RANGE capacity!



● Strippit unit with mechanical springs for piercing up to .500 mild steel.

- Up to .500 mild steel, using removable Strippit mechanical springs
- Up to .750 mild steel, with interchangeable Strippit Hydra-Springs
- Convertible from .500 to .750 capacity in seconds, at minimum cost
- One heavy-duty holder for both capacity ranges
- Readily replaceable punch tips and dies — round, obround, square, shaped
- Keyed punch body keeps punches accurately aligned

USING STRIPPIT MECHANICAL SPRINGS

Max. punch dia.	Max. material thickness (mild steel)
1.375	.250
1.250	.375
1.125	.500

USING STRIPPIT HYDRA-SPRINGS

Max. punch dia.	Max. material thickness (mild steel)
1.375	.375
1.250	.500
1.125	.625
1.000	.750

◀ Mechanical springs are easily replaced with Hydra-Springs for punching up to .750 mild steel.

WRITE TODAY for the new Strippit General Catalog. It covers all details on this and all other Strippit units... plus the savings in tooling and press time effected with the famous cost-cutting Strippit System of fabrication.

WALES STRIPPIT INC.

210 Buell Road • Akron, New York

A UNIT OF HOUDAILLE INDUSTRIES, INC.

Manufactured in Canada by: Strippit Tool & Machine Company, Brampton, Ont.

CALENDAR OF MEETINGS

Jan. 6-8, American Management Association: Special packaging conference, Roosevelt Hotel, New York. Association's address; 1515 Broadway, New York 36, N. Y.

Jan. 10-13, Institute of Scrap Iron & Steel Inc.: Annual meeting and exhibit, Fontainebleau Hotel, Miami Beach, Fla. Institute's address: 1729 H St. N.W., Washington 6, D. C. Executive vice president: Edwin C. Barringer.

Jan. 11-15, Society of Automotive Engineers Inc.: Annual meeting and engineering display, Sheraton-Cadillac and Statler-Hilton Hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Jan. 15, Malleable Founders' Society: Semi-annual meeting, Sheraton-Cleveland Hotel, Cleveland. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio.

Jan. 18-19, Industrial Heating Equipment Association: Annual meeting, Warwick Hotel, Philadelphia. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Robert E. Fleming.

Jan. 18-21, American Road Builders Association: Annual convention and highway materials and services exhibit, Netherland-Hilton Hotel, Cincinnati. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: L. W. Prentiss.

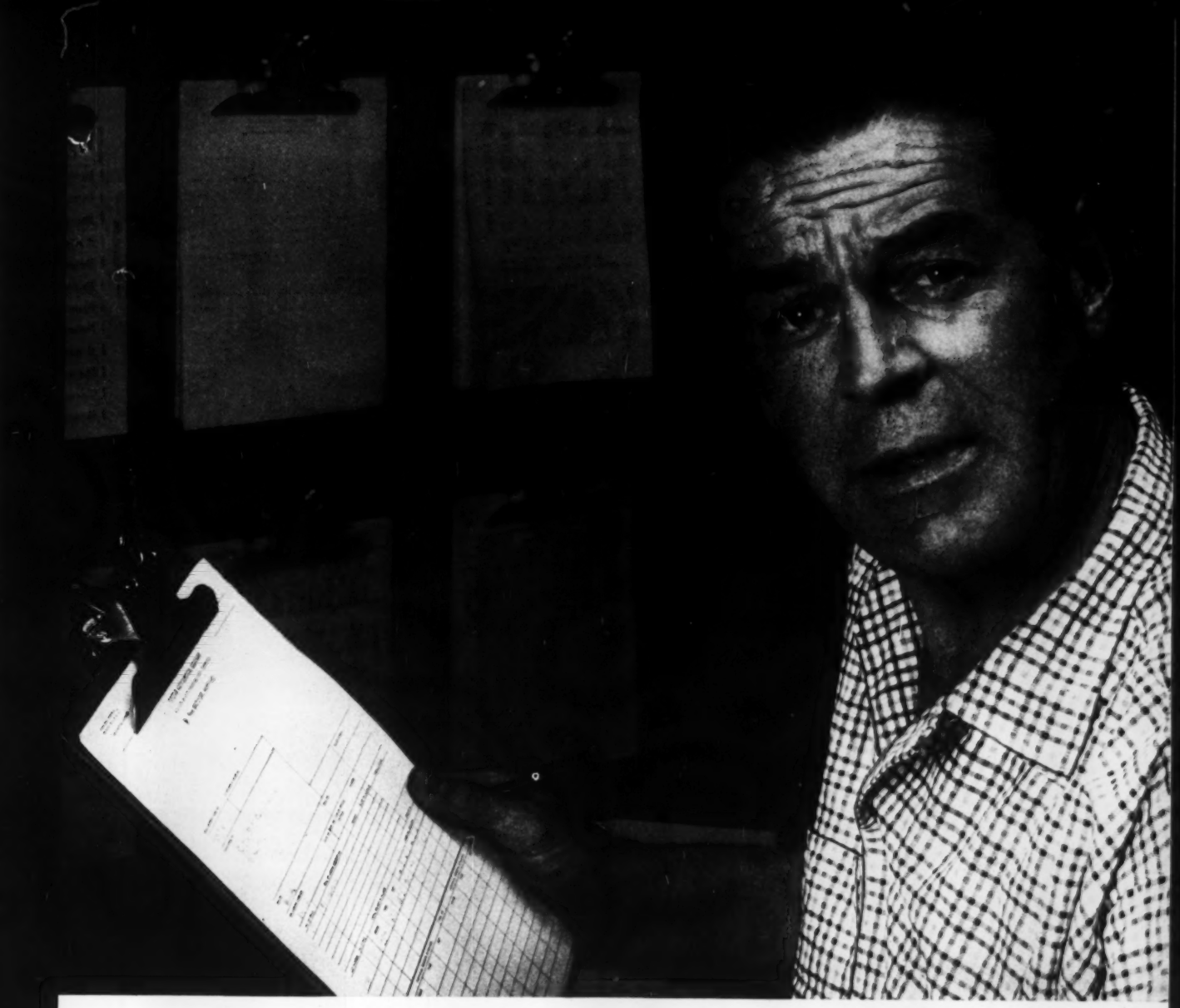
Jan. 19-20, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 20-22, American Management Association: Research and development conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Jan. 20-22, Steel Plate Fabricators Association: Annual meeting, Roosevelt Hotel, New Orleans. Association's address: 105 W. Madison St., Chicago 2, Ill. Secretary: J. Dwight Evans.

Jan. 21-22, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y.

Jan. 24-27, Truck-Trailer Manufacturers Association: Annual convention, Del Coronado Hotel, Coronado, Calif. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.



"Bagged alloys help keep our inventories straight"

Chief Clerks report: Monthly alloy consumption from furnace sheets closely checks with month-end inventories when ELECTROMET bagged alloys are used. Bags eliminate handling losses, aid inventory control, and help keep a cleaner furnace floor.

Melters report: More accurate ladle additions can be made with ELECTROMET bagged alloys. Result: More on-grade heats and closer control over deoxidation. Bagged alloys also yield 10 to 15 per cent higher recoveries in the ladle, cutting alloy costs.

For more information, contact UNION CARBIDE METALS, producer of more than 100 alloys—11 supplied in bags.

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In Canada: Union Carbide Canada Limited, Toronto.

Write for this new folder outlining bagged alloy advantages and specifications.

UNION CARBIDE METALS

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REVOLUTIONARY AO FACE SHIELD

BOTH VENTILATES AND PERMITS A CLEAR LOOK AHEAD!

Tempering chain saw bars after heat treating. Operator wearing AO "Kool-Vent" Face Shield has clear view of the work. Hands are heat protected by AO Silvabestos Gloves.

Photos courtesy Draper Corporation, Hopedale, Mass.

The cool comfort and ventilation of 24 mesh screen. The clear visibility of quality acetate. American Optical combines them in the Kool-Vent — latest and greatest development in face shields. Unit is mesh except for the area immediately before the eyes. It is recommended for hot operations or any operation where a man wants the best combination he can get of vision and ventilation. Back headband is fiber, adjustable. It fits snugly, comfortably. The long band slides within a fiber sleeve — permits easy nut adjustment for head size. See your nearest AO Safety Products Representative for this "first" in facial protection.

NOTE: The 11" gloves (AO 511SA) have a heavy wool lining throughout. The Silvabestos material has unusual abrasion resistance (up to 168% more) and 40% heat reflection.

Always insist on AO Trademarked Safety Products

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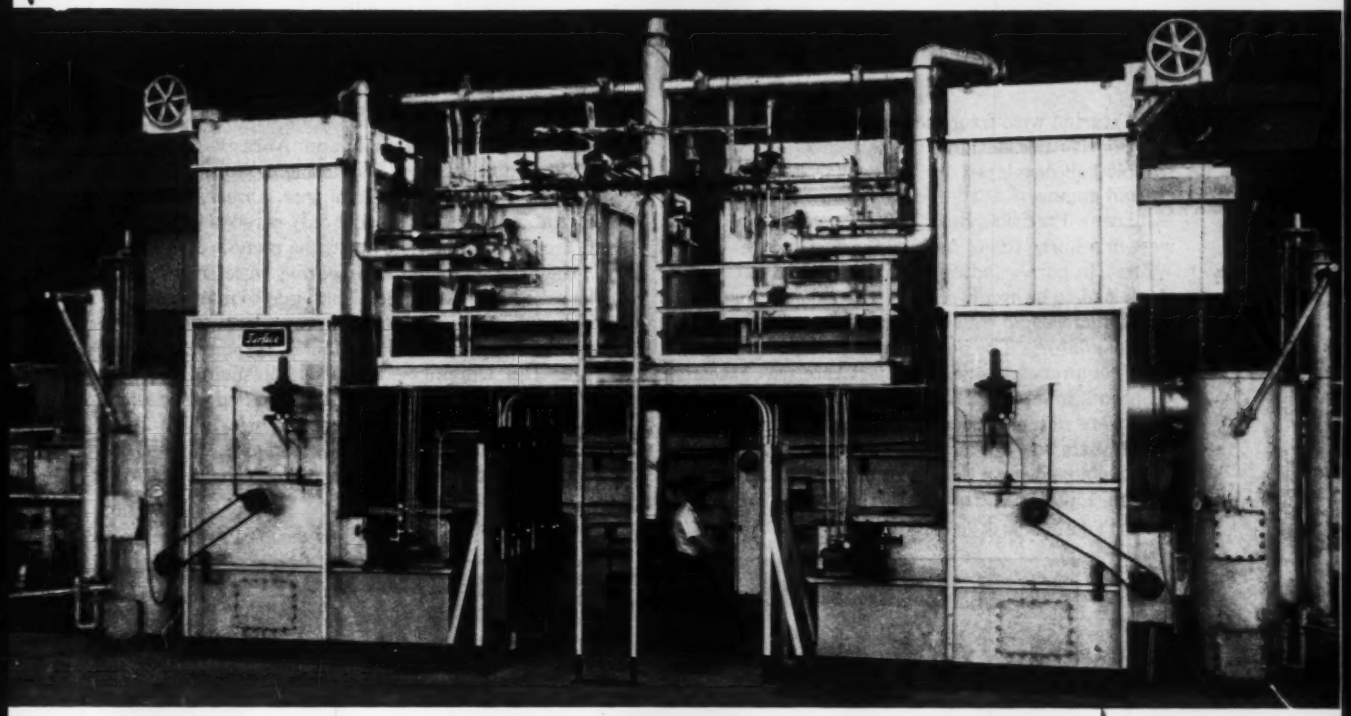


SURFACE POWER CONVECTION

speeds annealing rate to 8,000 lbs/hr of brass tubing

This furnace is one of Scovill Manufacturing Company's (Waterbury, Connecticut) answers to the threat of imported brass and copper mill products.

Scovill is after new highs in production and quality in its new streamlined tube mill at New Milford, Conn. This continuous roller hearth furnace, equipped with Surface Power Convection, helps achieve both goals. It anneals and cools 8,000 lbs. of brass and cupro-nickel tubing an hour. At the same time, it produces tubing of superior physical properties because it maintains temperature uniformity at plus-minus 8° F.

Such process speeds and temperature uniformity are possible only with Surface Power Convection, the most important advance in convection heat transfer in 20 years. Ask your Surface representative how you can apply this profitable new technology to your products. Write for Bulletin SC-182.

SURFACE COMBUSTION CORPORATION · 2385 Dorr Street, Toledo 1, O.
In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario

Surface

wherever heat is used in industry

Don Chisholm solved a double problem at Split Ballbearing . . .

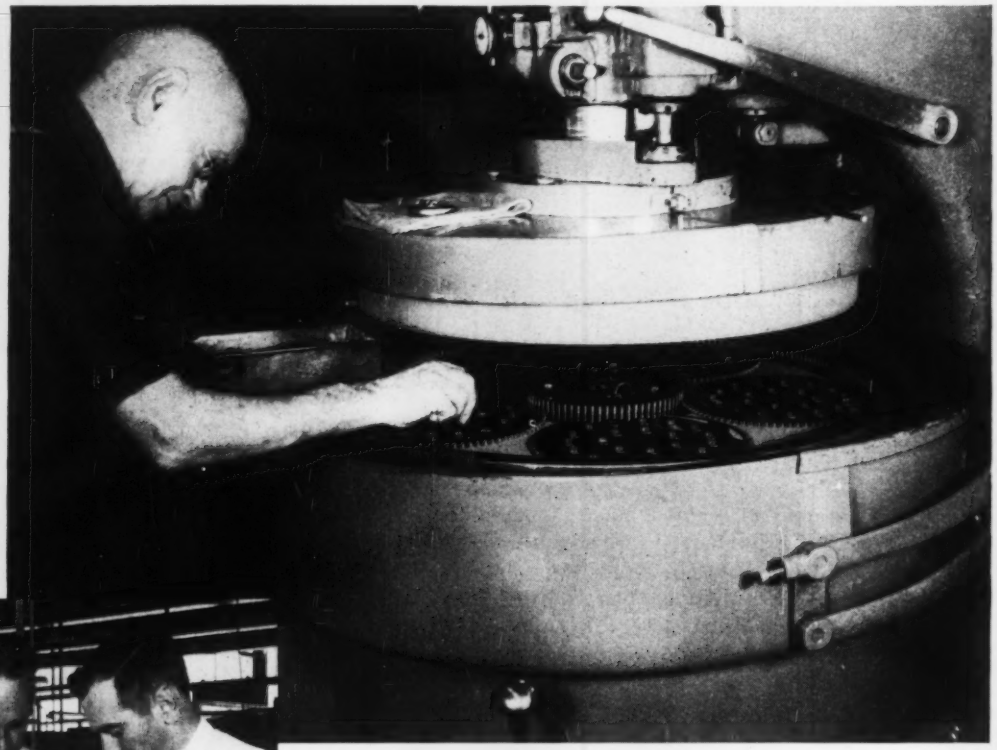
It all started with a torque tube bearing for one of the top priority missile guidance systems. Two kinds of trouble had developed during the manufacturing process and engineers at the Split Ballbearing Division of Miniature Precision Bearings, Inc., Lebanon, N. H., were in a hurry to get both of them straightened out.

First, in bore-grinding the inner race, about .010″ of stock had to be removed, but the tolerance specified was a microscopic ±.0001 and an eight microinch finish was mandatory. The bore-grinding wheel used wasn't up to requirements and the reject rate was excessive.

Second, in lapping the faces of both races, the wheels used were not producing the required five microinch finish, there was an imbalance between the amount of stock removed from the upper and lower surfaces . . . and, on top of that, the wheels themselves broke down too rapidly.

Bay State was called in and Abrasive Specialist Don Chisholm attacked the problem, working closely with Distributor Harold Domingue, Abrasives & Tools, Inc., Auburn, Mass. They not only cured both troubles and brought production up to the standards required . . . the people at Split Ballbearing were so delighted they asked Chisholm and Domingue to make a survey of every grinding operation in the plant. This led to fourteen other carefully considered recommendations.

Like Hal Domingue and Don Chisholm, the Bay State people in your area are trained specialists. Whether you have a single problem or a multitude of them, they're ready to apply experience, imagination and plain hard work. *Better grinding at lower cost . . . that is their business.*



Skill and experience play a vital part in maintaining the ultra-precise standards demanded by Split Ballbearing customers. Here, the company's senior machine operator, Emory Malloch, loads the fixture plate in the big production lapping machine with torque tube races.

Examining the precisely lapped finish on a pair of bearing races are Frank Orth (left), Chief Industrial Engineer at Split Ballbearing, and George R. Morin, Factory Manager.

and they gave him 14 more!

Don Chisholm has built a formidable reputation for solving tricky abrasive problems. Prior to joining Bay State as an abrasive specialist, he spent 17 years as Abrasive & Tool Coordinator at General Electric's turbo-super-charger and jet engine plants where his experience was extremely varied since he had to use abrasives on unusual alloys as well as the general run of industrial metals.

BAY STATE ABRASIVES

BAY STATE WHEELS of PROGRESS

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Tempilstik°—a simple and accurate means of determining preheating and stress relieving temperatures in welding operations. Widely used in all heat treating—as well as in hundreds of other heat-dependent processes in industry. Available in 80 different temperature ratings from 113°F to 2500°F . . . $2.00 each.

Send for *free* sample Tempil° Pellets. State temperature desired . . . Sorry, no sample Tempilstiks°

Most industrial and welding supply houses carry Tempilstiks° . . . if yours does not, write for information to:

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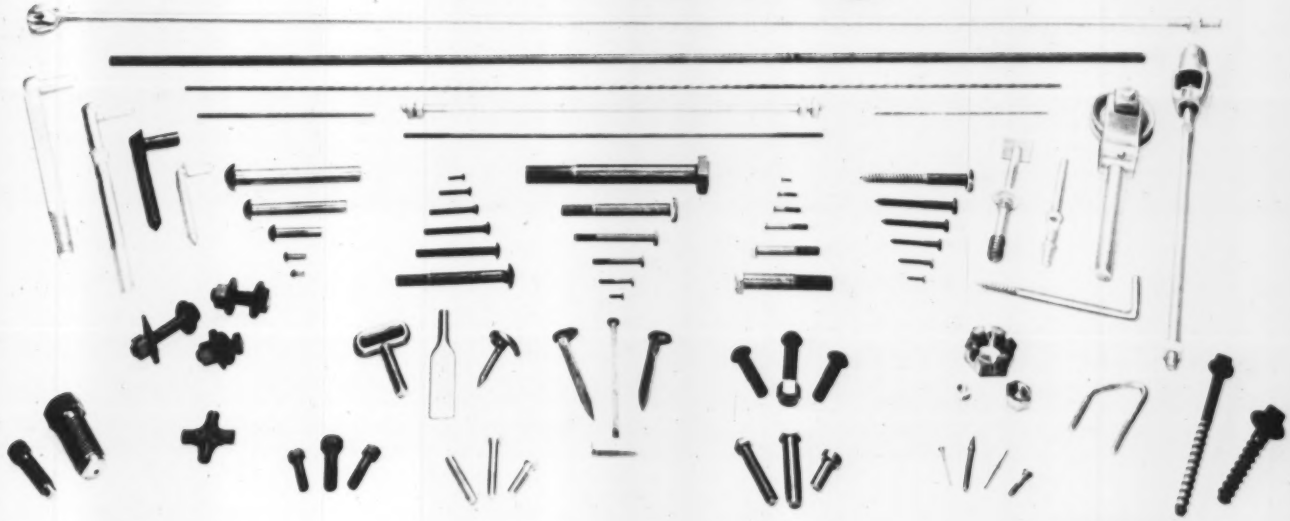
"Come along with me and see how we make fasteners"

"On these pages you'll see a few highlights of our largest fasteners plant at Lebanon, Pennsylvania. This entire plant is devoted to making standard and special fasteners. We hope this quick tour gives you some idea of our size, the products we make, and how we make them."

(In addition to our plant at Lebanon, Pa., other Bethlehem fasteners plants are located in Los Angeles, South San Francisco, and Seattle.)

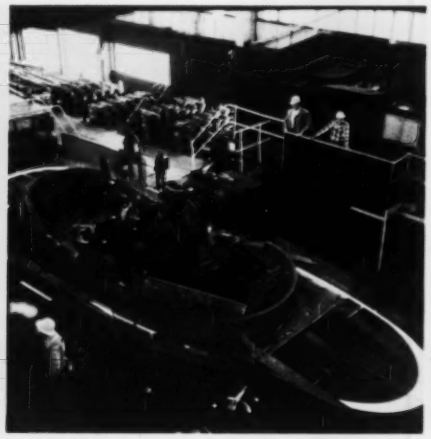


BETHLEHEM STEEL

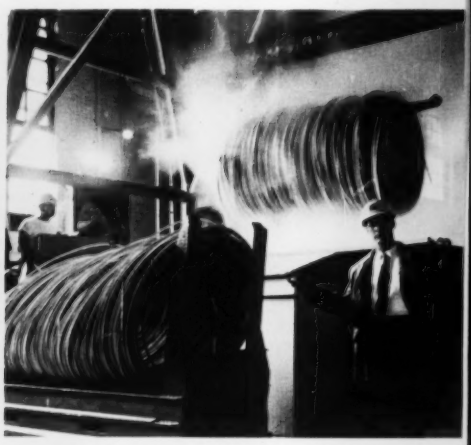
BETHLEHEM STEEL

"16,000 tons each month of standard and special fasteners. That's how much this plant can produce!"

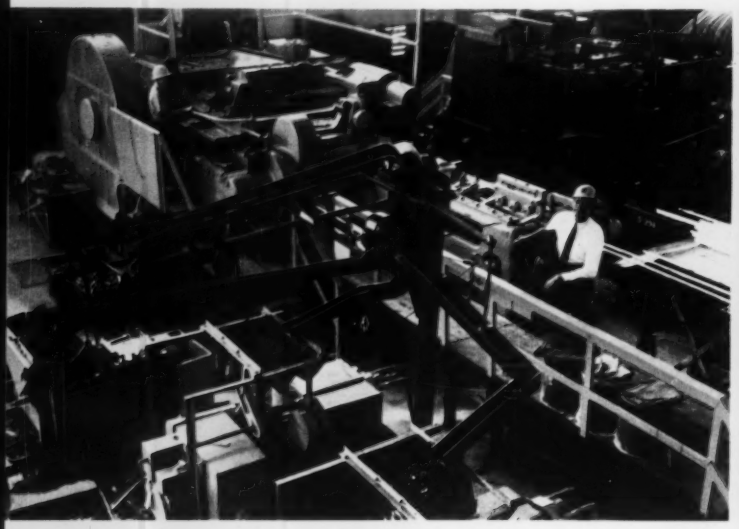
1. "Bethlehem controls every step in the manufacture of fasteners—even the mining of the iron ore. Our billets—we stock some fifty different grades at Lebanon—come from three nearby Bethlehem steel-making plants."



2. "This ten-inch continuous mill rolls the billets into straight bars, coiled bars, or coiled rods."



3. "Bolts can be made *hot* or *cold*. But before you can feed cold steel into an automatic bolt-making machine, the coils must be pickled to remove scale, and limed to provide a base for wire-drawing compounds."

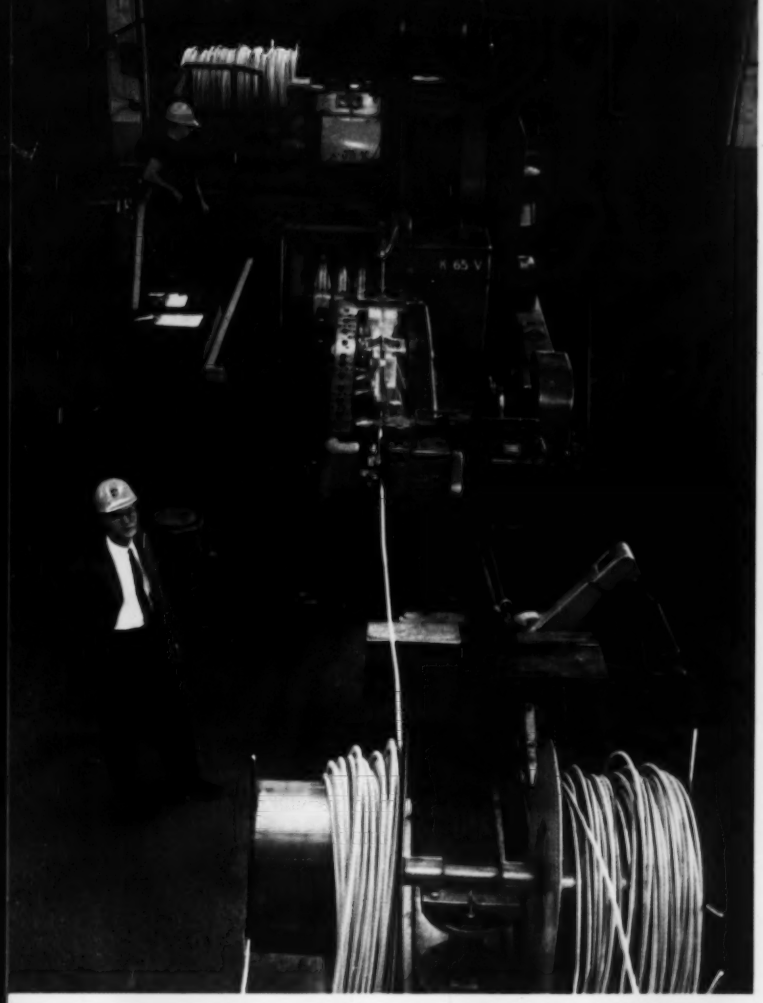


6. "Like bolts, nuts can be made either *hot* or *cold*. This cold nutformer makes ⅞ and 1-inch nuts. Other cold nutformers make nuts down to ¼ inch. Our hot nutformers make nuts up to 2 inches. We also make nuts by other processes up to 4 inches."

7. "Here's how a cold nutformer works. After the steel is drawn, the nutformer shears off a blank, flattens it, forms a partial hex, indents and expands to a full hex, finish-forges, and punches out the core. The nut is then tapped automatically."

BETHLEHEM STEEL

BETHLEHEM STEEL



4. "This particular boltmaker takes in coiled steel at one end, and ejects fifty finished, cold-headed bolts at the other—*every minute*. We also have batteries of hot-headers, and other cold-headers. All these machines are flexible—can turn out both standard bolts and special types of fasteners."

5. "How does a boltmaker work? A coil of steel is fed into the machine, and drawn through a die which sizes and straightens it. Then the machine shears off a blank, upsets it, heads it, trims the head and extrudes the portion to be threaded, points the bolt, and rolls the thread."

8. "Many customers require fasteners with improved mechanical properties. We're well-equipped for either batch-type or continuous-process heat treatments, as well as for selective surface induction hardening of fasteners."

9. "Our hot-galvanizing and electroplating departments are the most modern in the industry. All our standard and special products, with very few exceptions, can be hot-dipped in zinc or aluminum, or electroplated with zinc or cadmium."

"These modern facilities—plus many special-purpose machines for forging, threading, punching, bending, machining, grinding, and drilling—turn out one of the widest varieties and greatest tonnages of industrial fasteners of any one plant in the world."

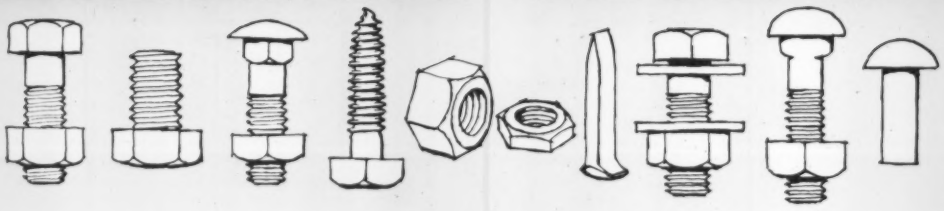
BETHLEHEM STEEL

"Quick delivery from stock"

"Standard fasteners—bolts and nuts, rivets, track bolts and spikes, construction materials—are in stock and ready to go. What you see below represents *less than ten per cent* of our stock of fasteners at Lebanon. It's easy to see why we're often able to ship your order the same day you place it.

"Special fasteners are also a big part of our production at Lebanon. We're set up to make them fast. And our fasteners engineers will be happy to help you with your special fastener designs."

"How do you get a shipment underway? Just get in touch with the Bethlehem sales office nearest you."



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Please send me Booklet 537, Industrial Fasteners—List Prices, Packing Quantities, Weights.

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BETHLEHEM STEEL

BETHLEHEM STEEL

GENERAL ELECTRIC DESIGNS NEW FURNACE FOR HIGH-TEMPERATURE VACUUM OPERATIONS

Versatile new radiation shield furnace breaks heat barriers of conventional furnaces for critical super-alloy heating jobs

These new General Electric radiation shield furnaces give you faster heating and cooling cycles than you can obtain with your present hot retort furnaces. But in addition, they offer unmatched versatility for your future heating needs which hot retort furnaces can't possibly handle.

G-E radiation shield furnaces have been designed to operate from 1900 F to 2600 F, and in smaller sizes up to 4200 F. They can be used with vacuum, or with inert or hydrogen atmospheres. They are readily adaptable for the heat treatment, brazing and sintering of super-alloy stainless steel, and metals like titanium and zirconium.

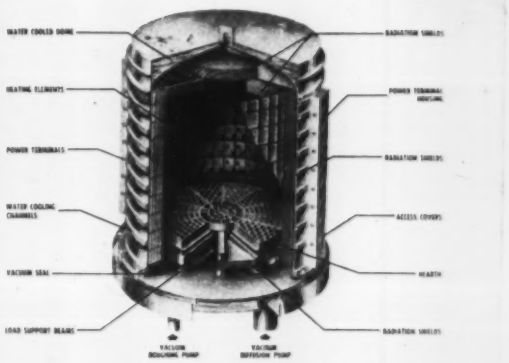
In addition to the versatility of higher temperatures and atmospheres, there's no metal retort between the heating units and the work in a radiation shield furnace. You get fast heating. And rapid cooling rates are provided by G.E.'s new cooling system that allows rapid recirculation of the cooling medium. Because of the more rapid heating and cooling cycles, a single radiation shield furnace can often do the work of a hot retort furnace with two bases and retorts . . . and give you substantial savings in floor space.

If you heat treat super alloys, seriously consider the advantages of a new G-E radiation shield furnace. You'll find General Electric engineers have the knowledge and design skill to match a furnace to your needs. Call your G-E Heating Specialist. Contact your nearby General Electric Apparatus Sales Office, or write Section 721-24, General Electric Company, Schenectady 5, New York.

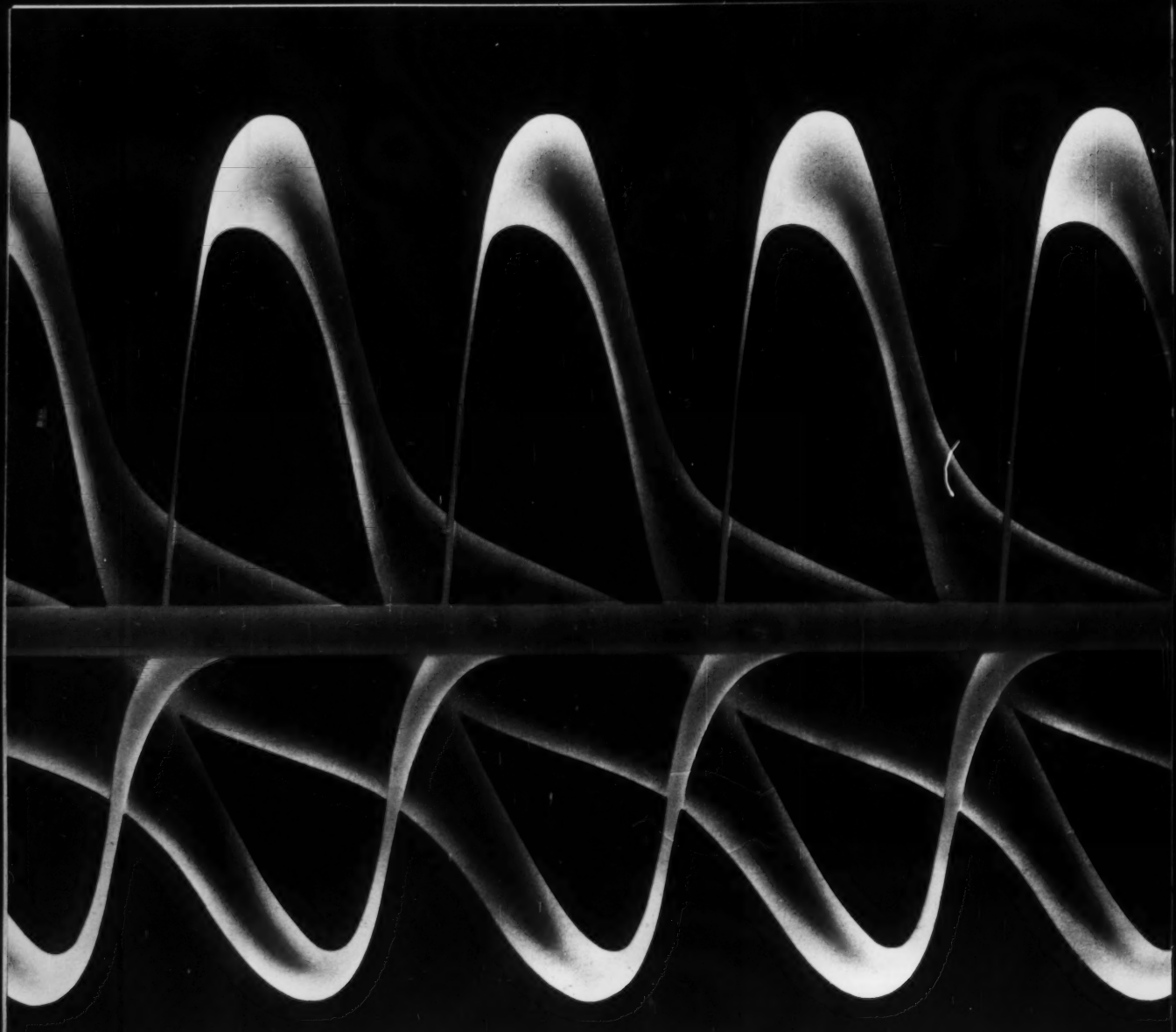
GENERAL ELECTRIC

TYPICAL APPLICATIONS	Stress Relief	Annealing	Brazing	Sintering	Solution Heat Treatment	Degassing
Stainless Steels	X	X	X	X	X	X
Super Alloys	X	X	X	X	X	X
Tungsten	X	X	X	X	X	X
Tantalum	X	X	X	X	X	X
Molybdenum	X	X	X	X	X	X
Columbium (niobium)	X	X	X	X	X	X
Titanium	X	X	X	X	X	X
Vanadium	X	X	X	X	X	X
Zirconium	X	X	X	X	X	X
Hafnium	X	X	X	X	X	X

***Chart shows wide range** of applications possible with G.E.'s new radiation shield furnace; typifies G.E.'s ability to provide correct heat treating equipment to meet almost every need.*



***The new radiation shield furnace** is another example of General Electric pioneering in the field of high-temperature heat treating. This furnace is rated from 1900 to 2600 F, in smaller sizes up to 4200 F.*



The cathode ray oscilloscope is one of science's and industry's most perceptive instruments for determining uniformity of operation. The pattern reproduced here is a harmonically modulated sine wave of exact uniformity.

Uniformity is Malleable

Just as the input of an oscilloscope can be controlled to produce repetitive patterns, so can consistently uniform metal parts be produced with Malleable iron because of modern, scientific controls. The unique method by which all Malleable castings are made and the exacting techniques employed by Malleable foundries assure Malleable users of castings that are uniform, part after part, regardless of size or shape. This uniformity, combined with unparalleled physical and mechanical properties, ideally suits Malleable castings for modern America's quality products.

For information or service, call on one of the progressive firms that identify themselves with this symbol—

MEMBER

MALLEABLE

CASTINGS COUNCIL

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

Better Products at Lower Cost Result From Malleable Uniformity Controls

Uniform quality — whether for five or five million pieces — is essential to maintain product quality and increase manufacturing efficiency. With accelerating frequency, Malleable castings contribute their unique uniformity in critical applications where durable, reliable components are necessary.

Key to Uniformity is Control

Malleable iron is produced under closely controlled manufacturing techniques. From charge composition and molding sand properties, through final inspection, every critical factor is held constant by using the most modern techniques of metal analysis, process control and inspection.

Internal Uniformity

This versatile engineering material is achieved through converting the base white iron into tough Malleable iron by a controlled heat treating process. Malleable's internal structure exhibits excellent uniformity, an important factor in assuring the dependable performance of intricately designed components.

External Uniformity

Fundamental to the casting process is the ability to produce a given shape, time after time, in either small or large quantities. Metal can be placed exactly where it is needed . . . eliminated where it is not. Good design — achieved through close cooperation between the customer and the foundry — can assure the necessary tolerances and the lowest possible finished part cost. Modern techniques of production and inspection are used to insure top quality, dimensionally accurate castings.

The life of every motorist rides in complete safety on Malleable wheel hubs of unerring uniformity.

Uniformity Proven by Use

The final test of any part is how well it stands up in actual service. Under continuous cyclic and shock loading, the millions of Malleable wheel hubs, which are in service on the front end of every American-made car, have compiled an enviable record of proven uniformity. Another dramatic example of Malleable's uniformity is proved in the old adage "A chain is only as strong as its weakest link." Miles of Malleable chain, carrying tremendous loads year after year without failure, demonstrate the uniformity of every cast link.

New techniques for controlling every element of Malleable production are the result of intensive research done by Malleable foundries in their continuing search for ways to make Malleable even more versatile and indispensable to industry.

More Information Available

Your copy of *Data Unit 103—Uniformity* — is available from any member of the Malleable Castings Council. If you prefer, write direct to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

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Terre Haute Mall. & Mfg. Corp., Terre Haute

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Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

REPUBLIC STEEL WIRE

Adds Glamour and Safety to Modern Design

The wire products shown on this page were fabricated from Republic Manufacturers' Coarse Wire by Kerr Wire Products Company, Chicago, Illinois.

Manufacturers who produce a wide variety of wire forms, such as The Kerr Wire Products Company, find Republic's wire a valuable aid in meeting design requirements, minimizing losses, and stepping up production.

Uniform quality assures accurate, easy forming with adequate strength and rigidity, and is one of the reasons why Republic Steel Wire is specified for difficult design and forming problems. Up-to-date machines and methods, skilled laboratory control and careful inspection assure every purchaser of Republic Steel Wire that it will suit his specific requirements.

Republic produces wire in a wide range of sizes, grades, and finishes. Large tonnages are used to fabricate fan guards, wire partitions, racks, grilles, display stands, reinforcing specialties, threaded fasteners, and many other wire products.

Republic Wire Metallurgists are always available to work with your personnel in solving production problems. This service is obligation-free. Mail the coupon if you would like an experienced wire metallurgist to call.

REPUBLIC PIG IRONS HELP PRODUCE highest quality die sets for the metal stamping industry. The Producto Machine Company, Bridgeport, Connecticut, casts die set parts in their own foundry using only raw materials with a definite known analysis, including Republic Pig Irons. The pig iron portion of the charge consists of equal parts of Chateaugay Pig Iron and Republic Malleable Pig Iron. The year-in, year-out uniform chemistry of these fine irons helps Producto produce high quality, laboratory-controlled castings. The company has found that there is no better, no more economical means for insuring strong, flaw-free, easy-to-machine castings. A Republic Pig Iron Metallurgist will give you all the facts on all Republic Pig Irons for quality castings. Mail the coupon today.

REPUBLIC STEEL SHEETS HELP PRODUCTION PROBLEMS VANISH. Whatever your product or production requirement, Republic can supply the right steel sheet to solve your problem. As a major producer of flat rolled sheets, Republic has developed and can furnish top-quality steel with the proper characteristics to provide easy fabrication and product dependability. Available in ENDURO® Stainless Steel, Electro Paintlok®, Continuous Galvanized, and Galvannealed. The coupon will bring you complete facts.

REPUBLIC COIL COVERS HELP PROVIDE shipping protection for coil users. These covers offer excellent weather protection, shut out dirt, stop vandalism, eliminate costly replacement of short-lived tarpaulins, eliminate the need for paper wrappings. Covers are easily handled by overhead or trackside crane and are designed for stacking. Republic Coil Covers measure 22 feet long, six feet wide, and six feet high. Two covers are used with each 52-foot gondola car. Send coupon for complete facts.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
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Send more information on:
☐ Manufacturers' Wire ☐ Coil Covers ☐ Steel Sheets
Have a metallurgist call:
☐ Wire ☐ Pig Iron

Name_____ Title_____
Company_____
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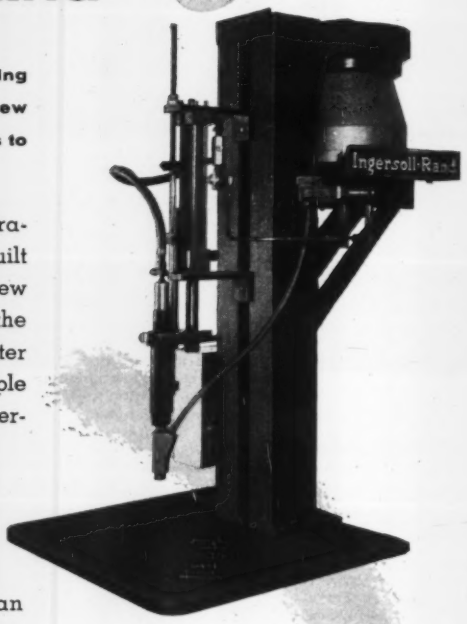
for complete flexibility in rapid automatic fastening

the NEW r.a.f. screw driver by Ingersoll-Rand

You get complete flexibility by moving, adding or removing powerheads—by varying screw types or sizes—or by adjusting power ranges to meet different torque requirements.

Now you can automate your fastening operations without buying expensive, custom-built fastening equipment. With the versatile, new R.A.F. Screw Driver, you can run one job in the morning, and a completely different job after lunch. Changing the screw pattern is as simple as loosening and then tightening two powerhead bolts.



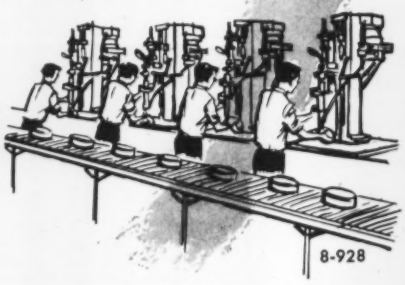
dividends on payroll dollars

Using the new R.A.F. Screw Driver, one man can outperform a half dozen operators using conventional hand held screw drivers. As an example of savings possible with Rapid Automatic Fastening, multiply the yearly wage you pay one operator by the number of operators the R.A.F. Screw Driver replaces. This figure, minus the cost of the R.A.F. Screw Driver, represents your Dividend on Payroll Dollars for the first year alone.

For the full story on Dividend Dollars with Rapid Automatic Fastening, call your local Ingersoll-Rand office today, or write for Bulletin 5266.

✶ in small shops

✶ on assembly lines



Ingersoll-Rand

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Tools plus AIRengineering increase output per man

"WEIRKOTE'S SOMETHING SPECIAL! IT CAN END THE NEED FOR ANY FURTHER CORROSION PROTECTION AFTER FABRICATION."

Q. You mean it? Weirkote can save you the cost of any further processing for corrosion protection after fabrication?

A. Absolutely. It's the continuous process that does it. Integrates the zinc to the steel so tightly there's never any peeling or flaking. No matter how severe the fabrication—any torture test you put it through—that bond stays put!

Q. Hmmm. Weirkote sounds great. One thing—is its zinc coating uniform throughout?

A. To the nth degree! Even the hardest-to-reach areas on the most complicated fabrications are completely protected.

Q. Corrosion-protected, you mean?

A. Corrosion-protected all over! So much so that you can work Weirkote to the very limits of the steel itself. So there you have it: stepped-up manufacturing efficiency, sharply curtailed manufacturing costs. All from Weirkote!

Send for free booklet that details the time-and-cost-saving advantages of skin-tight zinc-coated Weirkote. Just write Weirton Steel Company, Dept. B-1, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

SHORT TOOL LIFE due to chip weld, cratering and burning, in many cases, has been traced directly to lube oil dilution of cutting oil effectiveness. Cleartex can end this problem forever.

Diluted cutting oil shortens tool life drastically

Lubricating oil is probably leaking into the cutting oil sumps of your automatic screw machines as you read this. Current research proves that this is happening in 70% of all the automatics in use today! And where it happens, it shortens tool life by as much as 50%—even 70%. On top of this, the cost of extra regrinds, lost production during tool changes, and excessive scrap production is putting a premium on screw machine operation in too many shops.

Look for these symptoms. One sure sign of dilution is the need for frequent refilling of the lube oil sump. If you are using an ordinary lube oil, this dilution will create two additional—and more costly—symptoms: excessive scrap production and frequent regrinds. Now you can eliminate these forever with the

TEXACO CLEARTEX CURE

The exceptional chemical stability and load-carrying ability of Texaco's Cleartex series make them equally suitable for use as cutting oils, lubricants or hydraulic fluids. All you have to do is use them for both cutting *and* lubrication. With Cleartex in *all* your sumps, you'll find cutting oil dilution will stop and screw machine production cost will drop substantially.

Write today for your copy of Texaco's helpful new booklet "Cleartex in Automatic Screw Machines"...and contact your local Texaco Lubrication Engineer for an authoritative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. S-FM-24.

Tune In: Texaco Huntley-Brinkley Report, Mon.-Fri.—NBC-TV

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

HAMMER DOWN PRODUCTION COSTS WITH ALCOA ALUMINUM RIVETS

When you fasten parts made of aluminum with Alcoa® Aluminum rivets, you gain three important advantages. You improve the quality and appearance of your product, reduce material cost and speed up production for added savings. Economical, easy to work with, Alcoa Aluminum rivets seat and fasten quickly and are correctly tempered for the specific job at hand.

Alcoa Aluminum rivets are produced with straight or chamfered shanks. Their bright, flawless finish adds extra selling power to aluminum products. Galvanic corrosion and staining become problems of the past.

Get Full Count, Full Quality Alcoa Aluminum Fasteners

Your Alcoa Distributor, listed in the Yellow Pages of your phone book, carries complete stocks of all standard types and sizes . . . delivers quickly, anywhere, any time. For free samples and additional facts, mail the coupon today.

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Your Guide to the Best in Aluminum Value

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Gentlemen: Please send complete specification data and samples of Alcoa Aluminum Fasteners.

Name_____

Title_____

Company_____

Address_____

ONE important feature of automatic production is **the storage of shape in dies.** This is also the basis of closed die forging—"drop forging". **Chambersburg,** pioneer builder of equipment for making drop forgings, today builds tools that will shape forgeable materials to close tolerances by a combination of carefully designed die configurations, with precisely controlled forging blows and a fixed pattern of mechanized stock manipulation. When used with complementary shearing, heating, and trimming equipment, **fully automatic or semi-automatic production lines** are created which are capable of **increased output at lower costs.**

CHAMBERSBURG ENGINEERING CO.
CHAMBERSBURG • PENNSYLVANIA

A new publication, "The Automatic Production of Forgings in Closed Dies" provides the latest information on how to adapt these new developments to your drop forging operations. Write today for Bulletin 87-L-9.

CHAMBERSBURG

"THE HAMMER BUILDERS"

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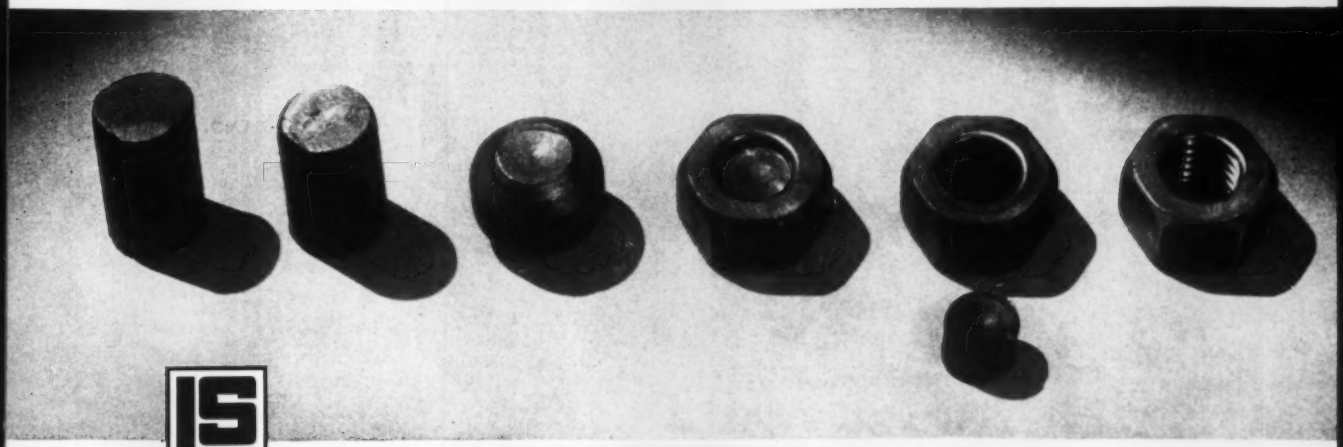
Designers and Manufacturers of
THE IMPACTER

Cold-forged nut machines *at Lamson & Sessions' Kent, Ohio plant thrive on a steady diet of Youngstown Scrapless Nut Quality Rod.*

Accent on Excellence

Youngstown scrapless nut quality rod

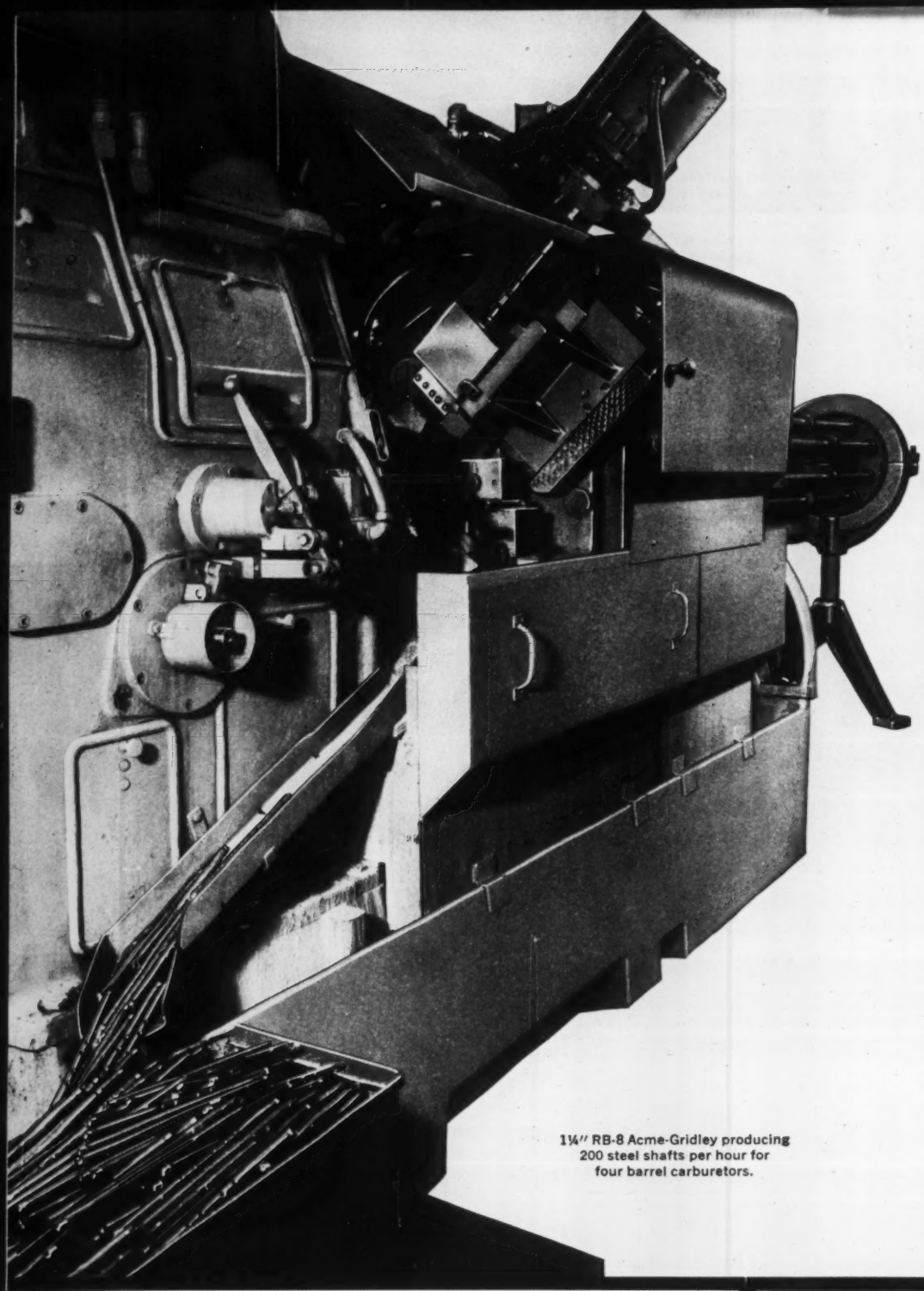


George S. Case, Jr., President of Cleveland's Lamson & Sessions Company, recently stated: "Today, as industry moves more and more toward automated or semi-automated production and assembly, *highest quality* and *reliability* of components becomes a *must*."

To keep their product quality at the highest level, Lamson & Sessions' engineers specify Youngstown's Scrapless Nut Quality Rod for cold forged nuts. This versatile rod feeds smoothly through the cold headers —results in fewer rejects, less downtime and reduced die wear.

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence". The Youngstown Sheet and Tube Company, Youngstown, Ohio. Carbon, Alloy and Yoloy Steel.

Youngstown



1¼" RB-8 Acme-Gridley producing
200 steel shafts per hour for
four barrel carburetors.

NATIONAL ACME'S "ZONE OF RESPONSIBILITY"

INCLUDES ALL PHASES OF COST REDUCTION

Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Carter Carburetor . . . an "every day" job for Acme-Gridleys.

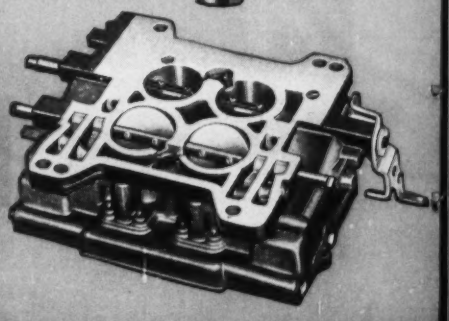
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



Versatile Acme-Gridley produces

EIGHT DIFFERENT PARTS

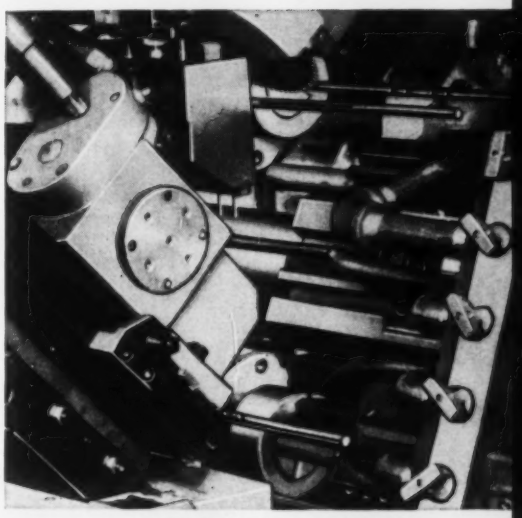
With Only Minor Changes in Tooling Setup

***For Carter Carburetor** division of ACF Industries, Inc.*

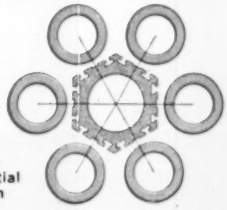
Here's machine tool versatility at its best . . . versatility that provides documented cost savings for Carter Carburetor year in and year out. Machine investment and cost-per-piece are greatly reduced. Illustrated is but one example.

The spindles of a standard 1¼" RB-8 spindle Acme-Gridley bar automatic were locked against rotation with a simple spindle locking device. Each spindle functioned as a work holder when the machine indexed from position to position. The inherent accuracy of Acme-Gridleys assured precise alignment of the work with the standard and special attachments . . . whether it's the first or last piece in the run. When spindle rotation is desired, the locking device is simply removed and replaced by the spindle drive gear.

Check the industry's most modern approach to tangible cost reduction. Call, write or wire today!



Close-up of tooling zone showing milling of slot in 4th position.



Pioneer in Circumferential Automation

National Acme

THE NATIONAL ACME COMPANY
189 E. 131st STREET
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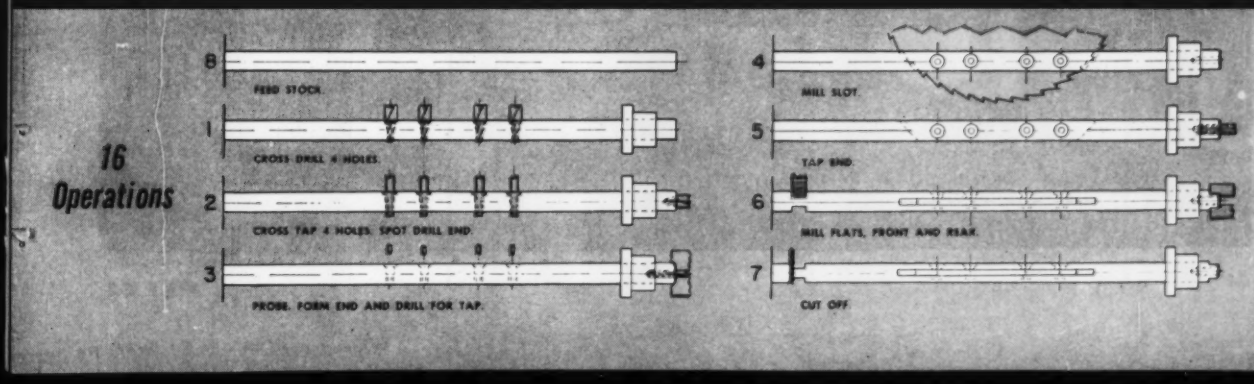
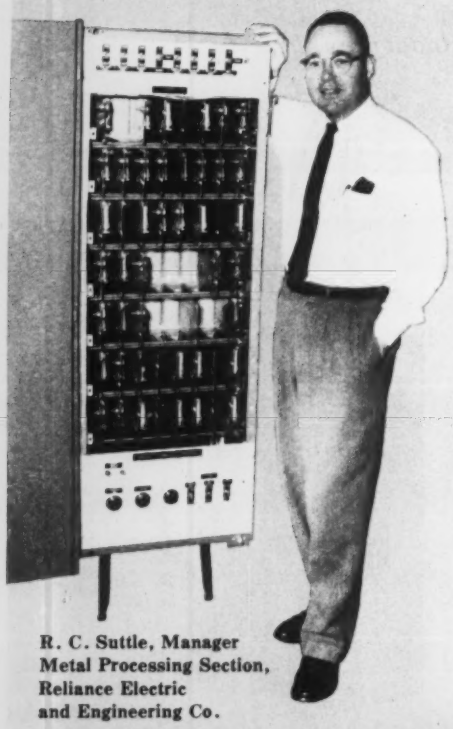
Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.



"Reliance V★S drives give American Can accurate system control for high-speed production."



R. C. Suttle, Manager
Metal Processing Section,
Reliance Electric
and Engineering Co.

"Precise system control for acceleration, deceleration and shearing is a vital contribution to this cut-to-length tin sheet line. A VSC voltage regulator controls acceleration on the unwind and leveler sections, and provides stepless speed changes. Unwind tension is accurately controlled by a VSR current regulator . . . and the entire drive is powered by Reliance D-c. motors.

"The speed of the shear is matched to the line by photoelectric loop control, maintaining loop position and assuring accuracy.

"Surface defects in the sheet are picked up visually—pin holes electronically. Mechanical gauges check uniform thickness. Rejects are dropped automatically following the shear. Automatic counting cuts handling time as the usable sheets are stacked on pallets."

These lines were developed by the F. J. Littel Machine Company, Chicago, and American Can Company and are installed in Canco Division plants.

Reliance engineers are ready to help you as they have many others, with a sound understanding of system problems and solutions. Consult your Reliance sales engineer . . . or write today for Bulletin Number L-2505 for complete information. D-1640

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

RELIANCE ELECTRIC AND ENGINEERING CO.

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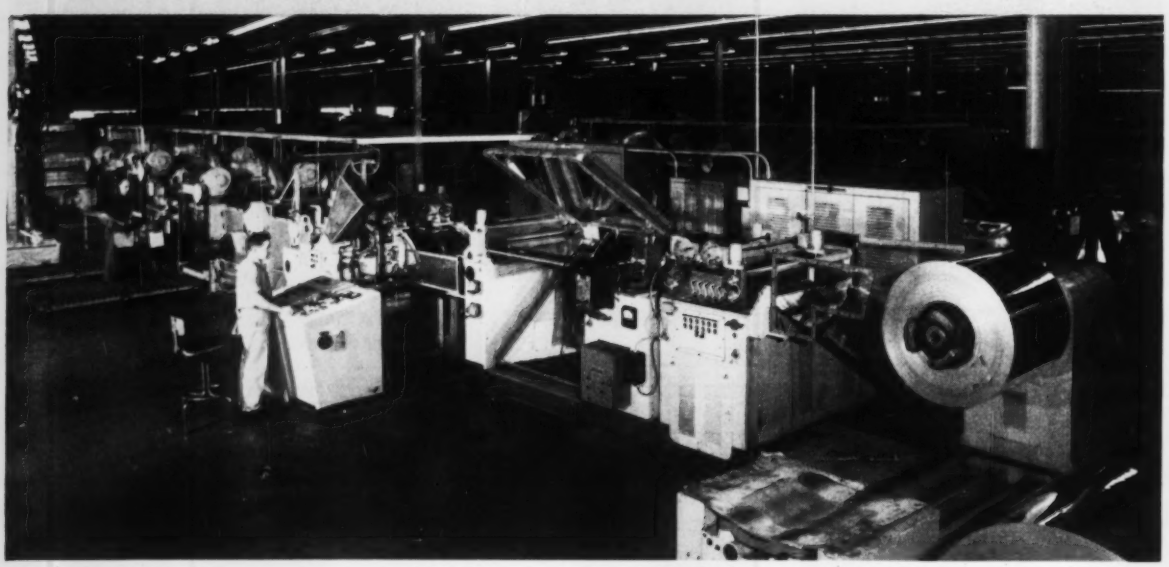
Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.



Which of these did you use today?

Alarm wake you this morning? Stove timer work all right? Did you drive to work . . . take a business trip by air . . . press a light switch . . . use a dictating machine . . . or home workshop motor? Then you, or someone in your home or business, used a spring. With a product-mix like this it's practically certain that we enter your daily living, tucked anonymously away in nationally known and respected brands of all sorts of articles.

Write for a copy of "How to Solve Your Spring Design Problems" to learn how early consultation with the spring manufacturer results in improved design and performance.

Associated Spring Corporation

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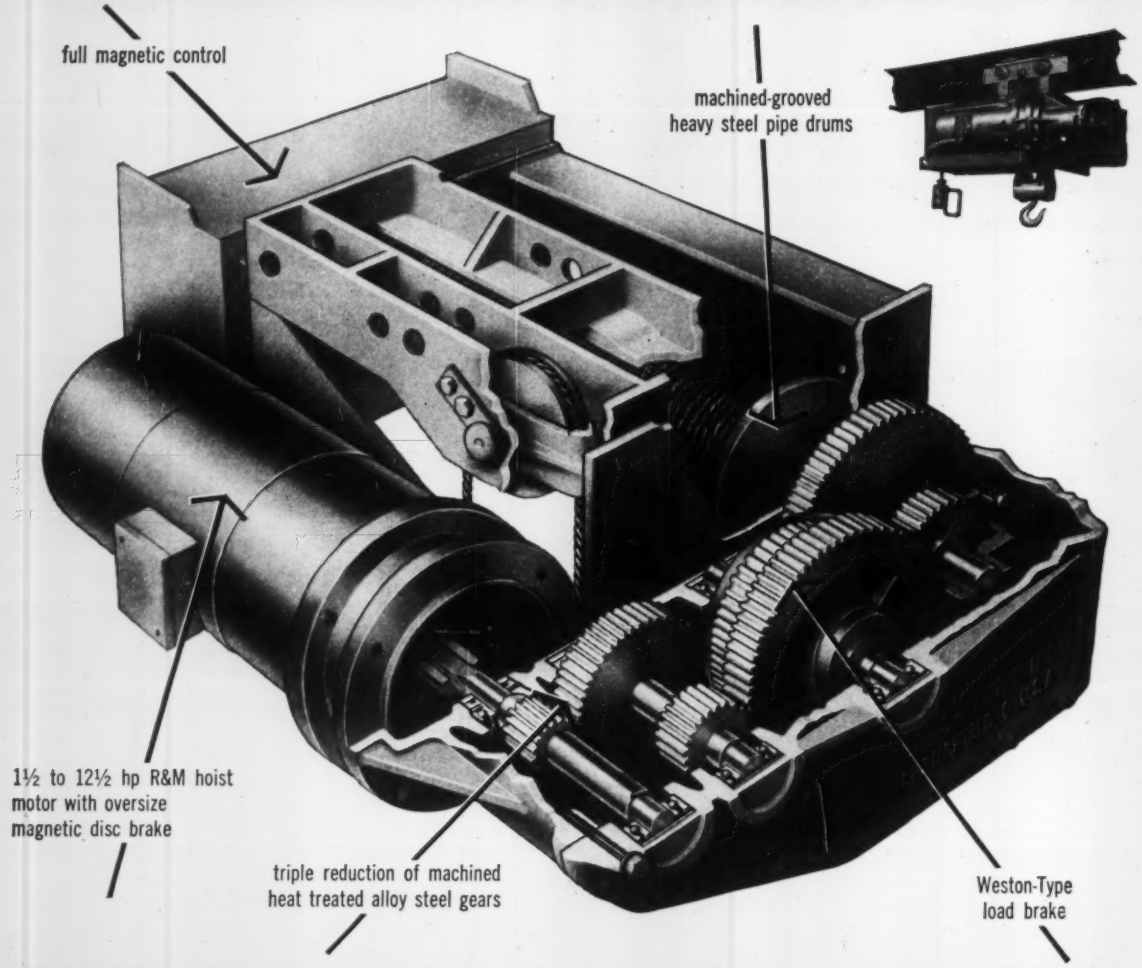
big hoist value



R&M Type F standard low-headroom hoists excel in the heaviest, most severe service. Frame is solidly braced welded steel. Special weather and dustproof R&M hoist motor runs cool, has the highest time rating found in any standard hoist—30 min., 55° C. rise. And the oversize magnetic disc type motor brake requires virtually no adjustment. Full magnetic control with reduced push-button voltage is standard. With lug mounting, Type F-2 headroom is only 16½" in 2 ton capacity.

Capacities: ½ to 10 tons. Speeds: 10 to 54 fpm. Lug mounting; push, hand geared or motorized trolleys.

Robbins & Myers, Inc., Hoist & Crane Div., Springfield, O.

take it up with

ROBBINS & MYERS

hoists cranes

Request Bulletin 801-C today

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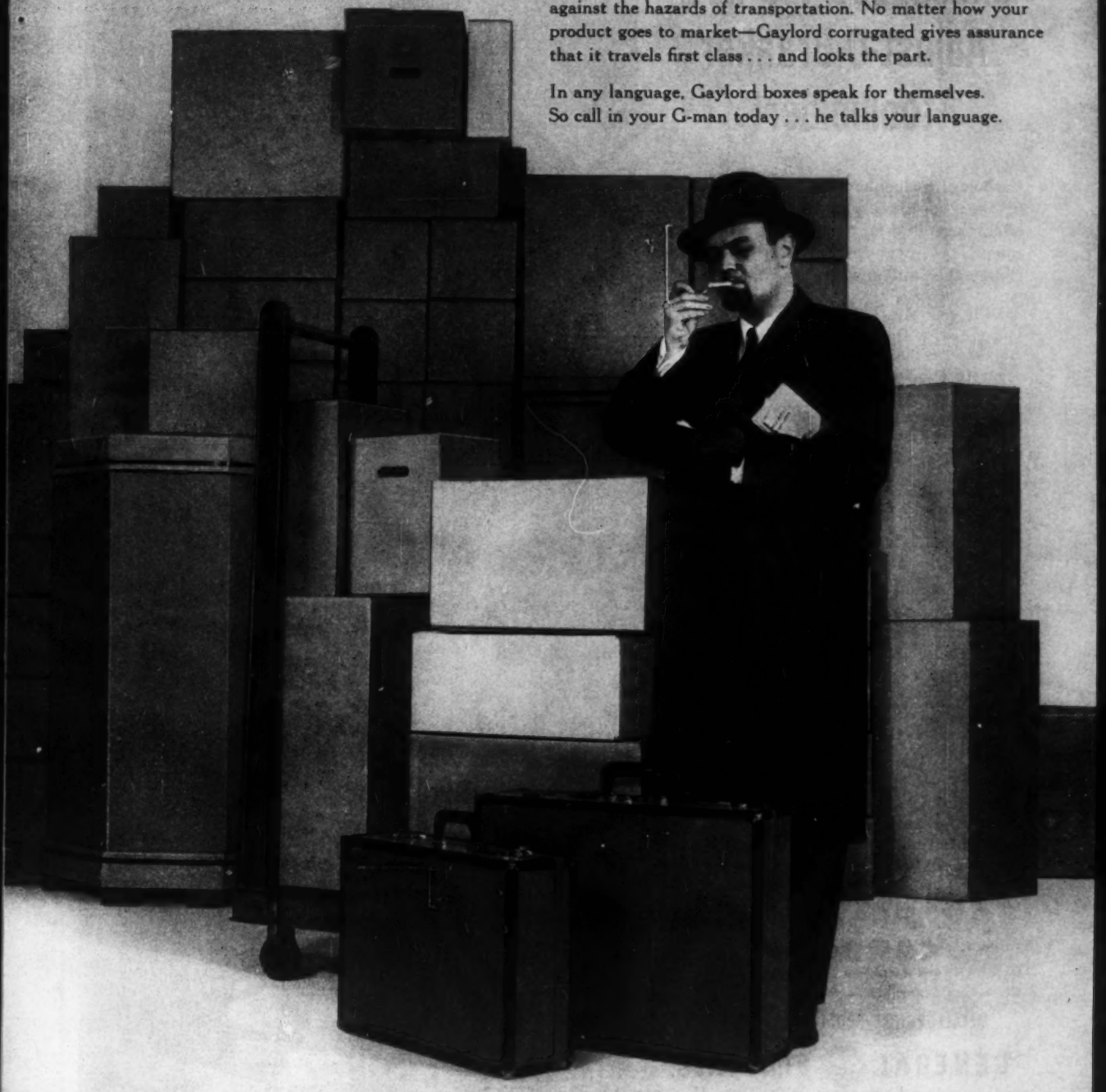
YOUR PRODUCT GOES FIRST CLASS

Corrugated boxes by Gaylord deliver positive protection against the hazards of transportation. No matter how your product goes to market—Gaylord corrugated gives assurance that it travels first class . . . and looks the part.

In any language, Gaylord boxes speak for themselves. So call in your G-man today . . . he talks your language.



GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

General Electric announces the new Adjust-O-Breaker toolholder!

Carboloy® toolholder with adjustable chipbreaker lets you adjust from any angle . . . offers any desired adjustment within its range* . . . features "floating" indexable chipbreaker with absolute repeatability.

MORE jobs with *LESS* tooling—that's what you get with this new Carboloy® Adjust-O-Breaker toolholder! No need to have a separate chipbreaker for every cutting job. No need to restrict yourself to toolholders with only two or three chipbreaker settings. Now you can have this versatile new Carboloy toolholder . . . and *adjust it for any chipbreaker setting within its range.**

Available right now from stock in 5 styles, negative rake, for left- and right-hand machining, the Adjust-O-Breaker truly brings new meaning to disposable tooling.

So, to get cutting tool versatility that lets you handle *more* jobs with *less* tooling, check into the complete Carboloy line—Lift-O-Matic (positive rake, negative rake, and tracer), heavy-duty, and the new Adjust-O-Breaker toolholder. The complete line of Carboloy inserts, insert seats, convertible seats, and brazed tooling is the *broadest* in the industry . . . designed to meet *every* tooling need to give you BETTER PROFITS THROUGH BETTER TOOLING.

See your Authorized Carboloy Distributor now. He's listed in the Yellow Pages. *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Street, Detroit 32, Michigan.*

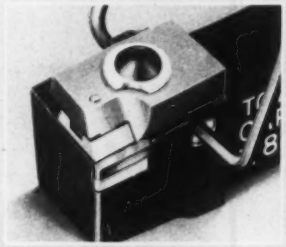
CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT
GENERAL ELECTRIC

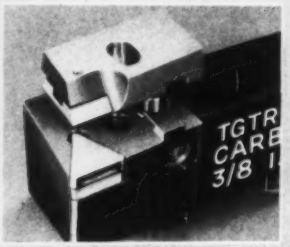
CARBOLOY® CEMENTED CARBIDES
MAN-MADE DIAMONDS • MAGNETIC MATERIALS
THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

Metallurgical Memo from General Electric

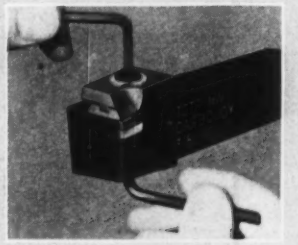
*Sizes 16V and 85V: adjustable range 1/16" to 7/32"
Size 20V: adjustable range 1/16" to 1 1/32"



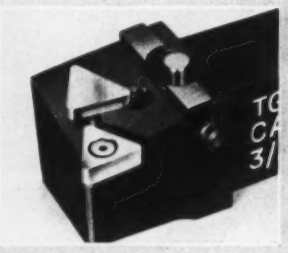
1. Chipbreaker setting adjusts to any width within range.* Set screw with two open ends provides access from either side. No springs to adjust.



2. Design permits absolute repeatability of settings. Floating chipbreaker is indexable. Can't drop out when clamp is loosened.



3. Clamp screw is accessible from top or bottom; allows easy indexing or replacement even when toolholder is vertical or upside down.



4. Standard disposable inserts, Carboloy insert seats and convertible seat are used with toolholder. Insert seats are indexable and self-aligning.

Roebling Wire in convenient bulk packaged to make your products easier

If you use high-carbon wire in sizes from .060" diam. to .030" diam., it will pay you to investigate Roebling's Reel-less Core Packaging System. This method offers you substantial savings in several ways—to say nothing of the quality wire that Roebling always delivers in any kind of package.

Here's how simple it is:
Cores are palletized two cores per pallet and can be stacked two or three pallets high (think of the saving in storage space).

Empty reels are not accumulated because there are no reels to store, send back, bookkeep, get credit on, or pay shipping charges on (either way). Just unwrap the wire, set it up the way you see here, and there you are. Where a limited number of reel-less core packages are used, or where wire is flipped from reels mounted in a horizontal position, the tilt table is not necessary.

This method is typical, indeed, of Roebling's efforts to make quality easier to handle and to banish the problems that cost you time, money and sharp pains across the brow.

Full details of wire without reels will be immediately forthcoming when you write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

I SEE JOE'S JUST MADE ANOTHER DRY RUN.
YEAH, THAT GUY'S SO CROSSEYED MOST OF THE TIME HE CAN'T EVEN HIT THE WICKET HOLE.
TWO BITS SAYS HE ASKS DUTCH TO KNOCK THE LIME OFF THE TOP OF THE SPOON.
THANKS TO— JUNIOR MELTERS, NO. 1 SHOP REPUBLIC STEEL CORPORATION CLEVELAND, OHIO.
HUEKES

The Dry Run

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

Magnefer and Syndolag Set Fast—Stay Fast

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

One More Meeting Before a Vote on the Steel Offer?

Look for Federal Mediator Joseph Finnegan to call Roger Blough (right), U. S. Steel Corp. chairman, and David McDonald, (left), USW chief, to Washington for contract talks. Probable timing: To coincide with President Eisenhower's return from overseas. Before going, Ike asked that negotiations be continued around the clock. So it will look a little better if the negotiations are in session when he returns. Expect the fact finding committee headed by Dr. George Taylor to resume its hearings between Dec. 28 and Jan. 6. The odds are still against a steel settlement before the NLRB election (Page 49).

NLRB Begins Preparations for Steelworker Balloting

Preparations are underway by the National Labor Relations Board to poll the nation's steelworkers. The election is reportedly scheduled for Jan. 14 through 21, if no settlement is made by then. NLRB officials emphasize that plans are not final—in fact, they don't even want to talk about them for fear of creating the impression that negotiations are frozen. One problem to be ironed out: Where to set up polling places (NLRB has sometimes rented halls, sometimes used company premises). The ballot will reportedly carry a summary of the industry's last offer—workers can vote "yes" or "no." The decision will be on an industry-wide basis.

Chicago PAs See Good Half Year Ahead

Business will be better during 1960's first half than in the last half of 1959, believe 60 per cent of the respondents to a survey by the Purchasing Agents Association of Chicago. Another 32 per cent believe the two periods will stack up about alike, while 8 per cent look for a decline in '60.

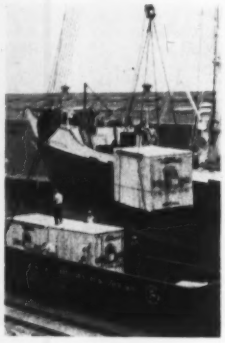
Payola in Industry? Not This Christmas

"Extravagant business gifts of the type associated with payola are on their way out, replaced with modest gifts selected with an eye toward value and good taste," reports the Business Goodwill Advisory Council. The average cost of a business gift this year is about $7.50 vs. $14 five years ago, says BGAC. But about 22 per cent more gifts will be given this year than last year, or 110 per cent more than five years ago. That'll push the '59 sales volume of the business gift industry near the $300 million mark vs. $253 million last year. Blaw-Knox Co., Pittsburgh, has stopped giving business

gifts and has diverted those funds for college scholarships to children of nonofficer employees.

Export Markets: Always Tougher to Crack

Look for metalworking to export 1.4 per cent more next year than this year. But since metalworking sales will rise about five times as much, percentagewise, as export volume, the metalworking industries will ship a smaller percentage of their output abroad next year than this year. Of the 13,400 metalworking plants that produce goods for export, about 36 per cent expect a higher volume next year than this year, while 64 per cent expect to ship the same amount or less. Transportation equipment makers are the most optimistic (Page 64).



Here's Another Indication of Manpower Shortage

The University of Michigan reports demand for its nontechnical graduates has increased substantially this year, while demand for technical graduates has nearly doubled. Result: Starting salaries have been pushed up about 10 per cent.

Where the Big Bear Threatens

Nikita Khrushchev is at controls of a giant machine designed to outproduce U. S. industry. Look for Soviet GNP to jump from about 46 per cent of ours in 1958 to about 53 per cent in 1965. The big emphasis is on steel production—ingot output is slated to reach 71.4 million tons next year vs. 65.1 million tons this year; rolled steel output will hit 55 million tons (Page 54).

An Answer to Office Featherbedding

One of every five officeworkers is dead weight, asserts L. O. Sweval of Profit Counselors Inc., management consulting firm. He says one way management can attack the problem is by using clerical work measurement methods.

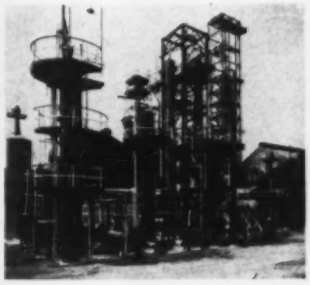
Iron Ore Prices Held Down by Imports

Iron ore prices in the U. S. would be $2 a ton higher today if so much foreign ore were not available, asserts H. Stuart Harrison, executive vice president, Cleveland-Cliffs Iron Co. Import tonnage is triple the 1949-53 average. Imports then were less than 9 per cent of consumption; now they are 30 per cent. Iron ore prices in the U. S. haven't changed for three years, despite

two wage hikes in the domestic ore industry. Cleveland-Cliffs plans to hoist its annual ore production to 16 million gross tons in the next decade vs. the present 9 million.

H-Iron Process Shows Promise

Alan Wood Steel Co. is making powdered iron by the H-Iron process, a fluidized bed, direct reduction technique developed by Hydrocarbon Research Inc. and Bethlehem Steel Co. Ores are converted into virtually pure iron oxide, then treated with hydrogen. The end product can be used in powder metallurgy or briqueted to make special melting stock (Page 94). Alan Wood's capacity: 18,000 tons a year.



The 1960 Auto Outlook

Business & Defense Services Administration calls itself "conservative" in predicting auto output of 6.7 million units next year—21.8 per cent more than were turned out this year. BDSA looks for record production during 1960's first half. Such a tempo augurs well for metalworking since the auto industry is the largest of the durable goods industries. It is the biggest consumer of steel, glass, rubber, and upholstery leather. It's one of the most important markets for malleable iron, copper, aluminum, lead, zinc, and nickel.

Compacts Shoot for Half the Car Market

By the early 1960s, half the new cars sold in the U. S. will be compact jobs, predicts George Romney, president, American Motors Corp. Sales of the small cars in '60 will reach 2,350,000 units, or about one-third of the 7 million to 7¼ million cars likely to be sold during the year, he says.

Welding Electrode Makers Foresee Big Year

Look for shipments of welding electrodes to top 800 million lb next year. This year's volume is running as much as 50 per cent ahead of the '58 pace, producers tell STEEL. One of the biggest buoying forces: The anticipated upsurge in industrial construction. Producers also expect to bring out improved welding machines in '60. But they are wary of a recurrence of steel labor troubles and new price pressures (Page 61).

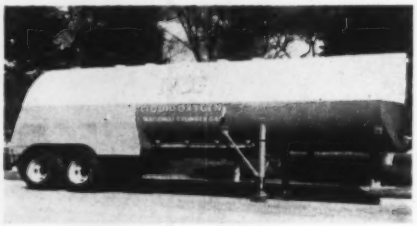
Three Industries Set Rapid Sales Pace

New orders for material handling equipment during the first ten months of 1959 climbed 23 per cent above those registered in the like '58 period, reports

Material Handling Institute (Page 52) . . . New orders for foundry equipment in October rose to an index level of 140.8 (1947-49 = 100) from 131.3 in September, says Foundry Equipment Manufacturers Association . . . Machinery Dealers National Association's index of used machine tool sales stood at 145.2 (1947-49 = 100) in October vs. 147.8 in September and 128.8 in October, 1958.

Aluminum Beats the Cold

It's being used, for example to store liquefied natural gas at −250 F. The metal shows no transition from ductile to brittle fracture. It boosts load carrying capacity of containers like that at right (Page 86).



Executives Are Optimistic, NICB Study Shows

The National Industrial Conference Board surveyed 220 manufacturing executives. The results: New orders—71 per cent expect first half, 1960, volume to exceed that of 1959's first half; 11 per cent expect a decline; 18 per cent foresee no change. Dollar billings—77 per cent say up; 11 per cent say down; 12 per cent say no change. Profits before taxes—67 per cent say up; 13 per cent say down; 20 per cent foresee no change. More than half those surveyed predict a buildup in dollar inventories; almost half say they will increase their capital spending. Among the executives' major worries: Tight money and steel shortages.

Electrical Appliance Sales Are Up Sharply

Here's how unit sales of electrical household appliances for the first ten months of 1959 compare with those in the like 1958 period, reports National Electrical Manufacturers Association: Refrigerators—up 25 per cent; freezers—up 14 per cent; ranges—up 30 per cent; water heaters—down less than 1 per cent; dishwashers—up 37 per cent; food waste disposers—up 29 per cent.

Straws in the Wind

Unemployment rose by 398,000 in mid-November to 3,670,000—less than the seasonal amount. So the government's seasonally adjusted rate of unemployment dropped to 5.6 per cent from 6 per cent in mid-October . . . General Electric expects a decline in defense sales next year to be more than offset by gains in industrial and consumer goods . . . Ralph M. Heintz, retired partner in Jack & Heintz Inc., has invented a system claimed to boost a car's gas mileage by 15 per cent while reducing unburned hydrocarbons by about two-thirds. . . . Pittsburgh Steamship Div., U. S. Steel Corp., has loaded its last iron ore for the season from the upper lakes region.

PITCHER BILLY PIERCE FAILS TO FLAKE INLAND TI-CO®

We'd told Bill to go on out there and knock the spangle off that TI-CO galvanized sheet. But what we hadn't told him was that for years, manufacturers have been deep-drawing, spin-drawing, punching, perforating, crimping and Pittsburgh lock-seaming TI-CO with . . . never a flaking problem!

Sure, he dented it. In fact, TI-CO's easy formability is one of the nice characteristics of this versatile galvanized sheet. It's one of the many good reasons why manufacturers use TI-CO for so many new applications and products.

We think you, too, will like the fact that TI-CO galvanized sheet won't chip, peel, crack or flake no matter how tough the requirements. It is manufactured with dry, oiled or chemically treated surfaces to meet your production needs. It comes in sheets or coils in a wide variety of gages and widths. We'd like to tell you all about its specifications in our free TI-CO booklet which we'll be glad to send at your request. Meanwhile, for your galvanized sheet or coil requirements, it's a good idea to consult your Inland representative.

American League Pitcher Billy Pierce makes a close-up inspection—finds not a trace of flaking on TI-CO's zinc coating.

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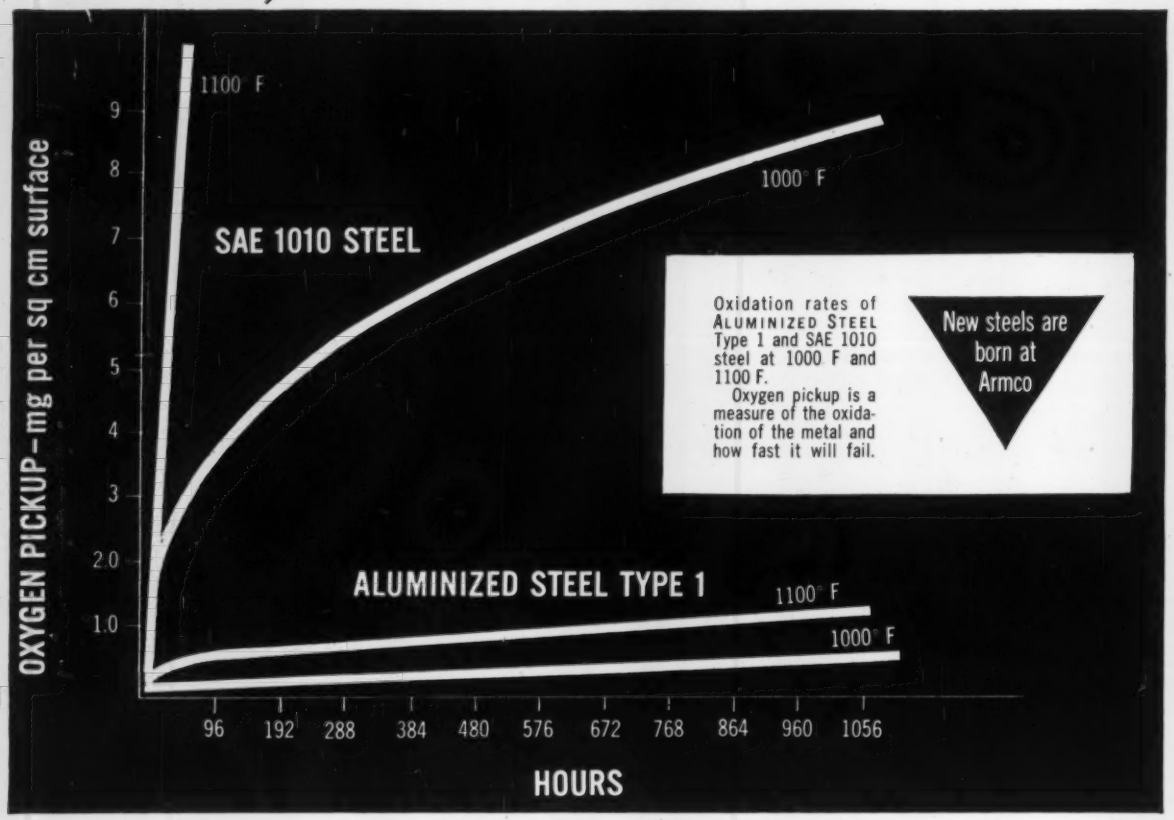


Research Data Shows Why Armco's Special Aluminum-Coated Steel Withstands Heat

Comparative oxidation rates indicate remarkable durability of corrosion-resistant Armco ALUMINIZED STEEL Type 1 at high temperatures.

Oxidation rates of ALUMINIZED STEEL Type 1 at 1000 and 1100 F compared with those of SAE 1010 steel demonstrate why this special Armco Steel has become a popular material for parts that must resist heat.

The hot-dip aluminum coating applied by a special Armco-developed process prevents oxygen from destructively scaling the base metal at temperatures up to about 1250 F. In addition, ALUMINIZED STEEL also provides good corrosion resistance. This unique combination of steel and aluminum withstands the corrosive attack of combustion products and condensates.

Because ALUMINIZED STEEL Type 1 combats both heat and corrosion and because its steel base gives parts high strength, it can be used in thinner gages and at higher temperatures than other metals.

For these reasons, Armco's special aluminum-coated steel has proved to be the most economical and durable metal for auto mufflers, heat exchangers, combustion chambers, industrial ovens, appliances, and similar products requiring resistance to heat and corrosion. Put the cost-cutting, performance-improving advantages of Armco ALUMINIZED STEEL Type 1 to work in your products. Write us for complete information. Armco Steel Corporation, 3249 Curtis Street, Middletown, Ohio.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Everyone's Strike

Within the next month, nearly half a million steelworkers will have voted on whether to accept the industry's last wage offer.

Between now and then one of the greatest battles for men's minds of all time will be waged.

The producers are issuing brochures to workers which detail and explain the terms of the last wage offer. Company presidents are appearing on television and radio to discuss and explain the industry's position. They are reassuring workers that the industry does not want to break the union, turn back the clock, destroy seniority, or impair employee security. The companies' case is well prepared, excellently documented.

Union leaders are appealing for a resounding NO vote. They are telling their story at union mass meetings, on television, and through printed publicity. They are appealing to emotions. They are playing on fear. The union propagandists are no slouches, and unlike the industry, they are not hampered by responsibility.

Several recent and impartial surveys indicate the trend of union member thinking.

They are not enthusiastic over their leadership. They do not want to strike again. Money is not the most important issue. In fact, most union members never were behind Dave McDonald's demand for a billion dollar bundle.

But they are confused by the work rules issue. They want to be loyal to their union. In interviews, they almost always refer to "our union." They do not want to repudiate it.

For those reasons, most observers believe the vote will go against the industry's last offer.

That action will probably toss the steel impasse into the public arena for settlement.

The dispute in steel is everybody's business. The pattern of settlement will become the pattern for many industries.

If we are to have a public decision, now is the time for you to be heard. You can help shape the settlement—one that is fair to the workers and one that will enable industry to contain inflation and to obtain the efficiency its modern equipment promises.

That is why your representatives in Washington are waiting to hear from you.

Walter J Campbell

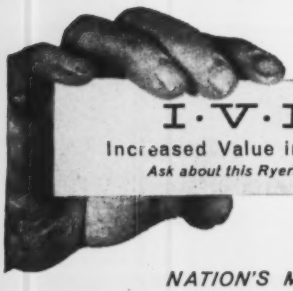
EDITOR

but only one was right for the job

Severe stresses imposed by this forming operation caused a high rate of reject for a fabricator using hot rolled plate to the usual ASTM—A7 specification. A call to his Ryerson Steel Specialist brought a suggested change to Ryerson welding and forming plate—a prompt solution to a costly problem.

Even in "plain carbon steel" applications, there's usually only one steel that's *exactly right* for each job. Nationwide, daily experience with a wide range of material selection and fabricating problems puts your Ryerson Specialist in the best position to know what is exactly right for *your* job. Backed by complete and diversified stocks, Ryerson can best supply that exact specification fast!

Let us help you make sure you get optimum value for your steel-buying dollars on every order—call Ryerson today.



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STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

What to Expect in Steel Case

Negotiated Settlement?

It's not likely before the Taft-Hartley 80-day injunction expires Jan. 26.

Workers' Vote?

The companies' last offer before Jan. 6 will probably be turned down.

U. S. Action?

President or Congress, spurred by public, will prevent another long strike.

THE STALEMATE in steel continues.

Each side will concentrate on the persuasion of steelworkers until Jan. 6 when the vote on the companies' last offer begins. Even the moves by the United Steelworkers to sign a contract with can, copper, and aluminum companies are being exploited to prove to USW members in basic steel that their union is "reasonable" and will negotiate. Some USW officials are reportedly concerned because of company charges that the union won't listen to reasonable industry proposals.

• **The Vote**—Most observers think the last industry offer will not be accepted. No matter how the issue is worded in the election (to be supervised by the National Labor Relations Board) steelworkers are expected to consider it this way: Do you vote for or against the union? They will not repudiate their union, no matter how they feel about the last offer, the strike's continuation, or David McDonald.

The USW electioneering effort includes: A barnstorming talking tour by Mr. McDonald and other officials, much soliciting of members, and frequent display of stickers and campaign buttons advising worker to vote NO on the last company offer.

Although the odds are against the companies, they will move into high gear after Christmas to persuade their employees to approve the last offer. The industry's reasoning is that a vote of 30 per cent for their proposal is far better than a 10 or 15 per cent one. The major companies have mailed explanatory booklets to their workers. They'll use the mails still more, as well as radio, television, and newspaper ads.

• **U. S. Action**—What can the government do immediately if the vote is to resume the work stoppage?

• The President could take sides and publicly recommend settlement terms. This is an outside chance, but still possible.

• President Eisenhower could recommend that another 80-day injunction be ordered by the courts on the ground that the emergency still exists. The disadvantage of this course is that the USW could challenge the move, which might mean a long legal delay.

• Voluntary arbitration could be accepted by both sides. Labor Secretary Mitchell has already suggested it and has been turned down. It does not require legislation and will probably be suggested again.

• Compulsory arbitration is a solution, but it requires a new law. Many congressmen have gone on record as opposed to it (STEEL, Dec. 14, p. 57).

• Seizure is possible if Congress gives legislative approval. But congressmen are wary of this course.

• Posse comitatus, a legal concept meaning "power of the county," could be broadened to the national level. Under common law, the sheriff could mobilize a posse of citizens to keep the peace. The President would declare an emergency, view the steel mills as part of the public domain temporarily, and order all employees—labor and management—to their posts. Congress would then be called on to establish a board for "just compensation."

• **For Long Term**—Those are short term possibilities for ending the steel impasse. For the long pull, most legislative suggestions are reportedly in two areas:

1. Apply antitrust laws to the unions.

2. Give the President a wide choice of procedures he could follow if anything like the steel case ever comes up again.

A minority among labor experts thinks U. S. action won't be needed. After the vote, they reason, the industry will make a slightly sweeter offer that will be accepted by the USW, which fears Congressional action.

Fringe Benefit Costs Up 8 Cents an Hour Over '57

Size of Company (By number of production workers)	Weighted Average Cost In Cents Per Company Per Manhour*	
	1959	1957
1-100	46.70	41.47
101-1000	54.39	44.72
Over 1000	61.22	52.62

Source: Associated Industries of Cleveland.
*Overtime premiums and shift differentials excluded.

EMPLOYEE BENEFITS are costing Cleveland employers a weighted average of 57.46 cents per manhour, reports Associated Industries of Cleveland. It surveyed 166 companies employing 53,101 hourly paid production workers.

The increase amounts to 7.96 cents an hour since 1957, says AIC. About 20 per cent of wages are now allocated to fringes compared with 13 per cent in 1947.

Employee benefit costs, sometimes called industry's hidden payroll, represent money paid in services and benefits in addition to direct wages. On the basis of a typical work year of 2000 hours, the average annual cost in 1959 was $1149.20 compared with $990 in 1957.

Large and medium size firms are usually the first to grant new employee benefits and enlarge or improve present ones. That's why benefit costs are generally lower for the smaller firms (see table).

Over 30 employee benefits were covered by AIC's study: Bargaining and grievance time, bonuses, cafeterias, credit unions, employee education, gifts and awards, paid holidays, insurance, hospitalization, jury duty, lunch periods, National Guard duty, pensions, profit sharing, recreational activities, rest periods, severance pay, sick leave, Supplemental Unemployment Benefits, uniforms, vacations, wash up time, welfare funds, and other miscellaneous benefits, in addition to the legally required payments such as unemployment and workmen's compensation. The most expensive benefits were pensions (13.48 cents), profit sharing (13.46 cents), vacations (12.5 cents).

Employers participating in the survey represent a broad cross section of the Cleveland area's industry and labor force.

'Share the Progress' Kaiser Unit Named

UNION and management members of Kaiser Steel Corp.'s unique Committee to Develop a Long Range Plan for the Equitable Sharing of Economic Progress were announced last week.

Named by the United Steelworkers: David J. McDonald, USW president; Arthur Goldberg, general counsel; and Charles J. Smith, West Coast district director.

Named by Kaiser Steel: Edgar F. Kaiser, Kaiser chairman and president of Kaiser Industries Corp.; E. E. Trefethen Jr., vice chairman of Kaiser Steel; and C. F. Borden, newly elected executive vice president of Kaiser Steel.

Those men will serve with the previously announced public members of the three party committee: Dr. George W. Taylor, University of Pennsylvania professor and current chairman of President Eisenhower's Taft-Hartley Board of Inquiry; Dr. John T. Dunlop, Harvard University professor; and David L. Cole, former director of the Federal Mediation & Conciliation Service.

Thomas T. Inch, vice president of Henry J. Kaiser Co. and veteran Kaiser industrial relations official, will serve as executive director of the committee.

The committee was created in the contract settlement between the USW and Kaiser Steel. Its task: To recommend a formula to "give appropriate consideration to . . . safeguarding the employees against increases in the cost of living, to promoting stability of employment, to reasonable sharing of increased productivity, to labor cost savings, to providing for necessary expansion, and to assure the company's and employees' progress."

Recommendations by the committee are to be made to the USW and Kaiser by July 1, 1960.

How Three Nations Stop Major Strikes

THE CURRENT labor trouble in steel has provoked much thought on how to avoid chronic strikes which cripple the nation's economy. Australia, New Zealand, and Sweden have admirable records of labor peace. Here's how they do it:

• **Australia**—Australia has a national minimum wage. Tradesmen and semiskilled workers must be paid a certain margin above the basic scale. Women are paid 75 per cent of the male rate. The wage index is adjusted every three months according to the cost of living.

Labor-management agreements are legal awards enforceable through the courts. Disputes are heard locally by the Conciliation & Arbitration Commission which makes an award that must be accepted by both sides. If one party refuses to accept the commission's terms, a federal industrial court steps in. There is no right to appeal to the High Court (equivalent to our Su-

preme Court) except in purely legal questions.

Union or management organizations can be fined up to $1250 per day for contempt of court. Officials of such organizations can be jailed up to 12 months for defying court orders. Unions can be fined for illegal strikes or work slowdowns.

The last major strike in Australia, where over 75 per cent of all workers are unionized, was a three week dock tieup in 1956.

• **New Zealand** — Statistics show that the strike is diminishing as a weapon in New Zealand, where union membership is compulsory. Disputes are referred to a conciliation court whose proceedings are not binding. If no agreement is reached, the dispute goes to an arbitration court which gives a binding decision to all parties.

Strikes and lockouts are illegal while an arbitration court is making a decision. Legal strikes can occur upon expiration of an award, but only after the union has held a secret ballot vote under Labor Department supervision.

Compulsory conferences are called in deadlocks. If the government is satisfied that the union is responsible for severe stoppages, it may deregister a union. This freezes the union's funds and removes legal protection. In general, deregistered unions fold after being replaced by new unions under new control.

• **Sweden**—An agreement, signed in 1938 between the Trade Union Congress and the Employers Federation, makes it illegal for a strike to start before a contract expires. Negotiation must begin before any strike or lockout. Although participation in this agreement is voluntary, much of the traditional tension between labor and management has disappeared. Only one major strike has occurred since the signing. As a result, a compulsory arbitration law, which provides for the appointment of an arbitration court during disputes deemed detrimental to the nation, has never been invoked. The court's decision could not be appealed.

Companies may run time studies and labor may make recommendations to lower levels of management.

CAPITAL SPENDING PLANS

Up in '60

(Millions of dollars)

	1960 (Jan.-Mar. adjusted at annual rate)	1959	1958
Manufacturing (Durable goods table below)	**13,840**	12,056	11,433
Mining	**950**	988	941
Railroads	**840**	934	754
Transportation other than rail	**2,150**	2,044	1,500
Public utilities	**5,590**	5,745	6,088
Commercial & others*	**11,030**	10,874	9,810
Totals	**34,400**	32,641	30,526
Durable goods†	**6,970**	5,769	5,469
Primary iron & steel	**1,510**	1,021	1,192
Primary nonferrous metals	**370**	327	441
Electrical machinery & equipment	**540**	503	459
Machinery except electrical	**1,000**	929	915
Motor vehicles & equipment	**840**	624	558
Transportation equipment, except above	**460**	387	370

*Includes trade, service, finance, communication & construction industries.

†Includes industries not shown separately. Nondurable goods not shown.

BUSINESS outlays for plant and equipment are rising to seasonally adjusted annual rates of $34 billion in the current quarter and should hit a $34.5 billion pace in the first quarter of 1960.

Outlays in the third quarter were at an annual rate of $33.5 billion, says the Department of Commerce and the Securities & Exchange Commission. Total spending in 1959 is expected to reach $32.5 billion, about 7 per cent above the 1958 total.

Plant and equipment expenditures in 1959's last two quarters fell below earlier estimates, as a result of the steel strike. Durable goods manufacturers, mainly the iron and steel industry, accounted for most of the dip. Electric and gas utilities also lowered their spending.

Manufacturers expect capital expenditures in the first quarter of 1960 to hit a seasonally adjusted rate 15 per cent above the 1959 average. Spending at an annual rate of $13.8 billion in 1960's opening quarter compares with a rate of $12.2 billion in the third quarter of this year and $12.8 billion in the current quarter. Durable goods manufacturers will up their spending 20 per cent above 1959's, while nondurable goods companies anticipate a rise of about 10 per cent.

Railroad expenditures rose sharply through the third quarter, but the industry has scaled down its programs for the last 1959 and first 1960 quarters. Capital outlays by nonrail transportation companies have shown a steady rise this year, but some leveling out has been scheduled for early next year, says the Commerce Department.

Milwaukee Growth Slows

A rise in new plant and equipment spending by Milwaukee manufacturers (from $56.2 million in 1958 to $61.5 million in 1959) may precede a downturn in area expansion in the early sixties, says the Milwaukee Association of Commerce. Projected spending plans of 43 factories and two public utilities show that outlays will decline in the next three years to a level of $43.1 million by 1962.

Expenditures of the 45 companies for new facilities outside the state rose from 8.5 per cent of their total spending in 1958 to about 11.9 per cent this year and will reach 19.4 per cent by 1962, says the association. One firm said it would not build in the area, "in the face of the punitive tax setup"; another is holding up plans beyond 1959 until, "the Wisconsin tax picture is clarified."

Bethlehem Adds Ovens

Bethlehem Steel Co. will build a battery of 76 coke ovens to expand its Lackawanna plant's annual capacity to nearly 3 million tons in 1960. When the new battery goes into operation next November, the plant will have eight batteries (535 coke ovens).

Besides the ovens, plant improvements will include extension of the present coal storageyard, new coal and coke conveyors to service the new batteries, and additions to the coke byproducts plant.

The expansion is being made to meet the plant's growing needs for blast furnace fuel, says Bethlehem.

Rail Labor Outlook

Threatened railroad labor walkouts in 1960 may be averted, says a top union source. If a national strike is called, it won't come before May 1, predicts G. E. Leighty, chairman of the Railway Labor Executives Association.

Mr. Leighty's views represent the most optimistic appraisal of the rail labor dispute yet made by a union spokesman. Major railroads are negotiating with the unions for a new agreement to replace the three year pact which expired Nov. 1.

C. L. Fell and Robert F. Moody take top MHI posts as . . .

Handling Equipment Makers Predict 10% Sales Boost

SALES of material handling equipment in 1960 will be at least 10 per cent ahead of this year's, reaching a new high of $1.65 billion, reports C. L. Fell, new president of the Material Handling Institute Inc.

Mr. Fell, vice president-marketing of American Monorail Co., was elected by the MHI in New York last week. Robert F. Moody, sales manager, Hyster Co., Portland, Oreg., was elected first vice president. B. E. Phillips, manager of Clark Equipment Co.'s industrial truck division, Battle Creek, Mich., is the new second vice president.

The 1960 projection compares with sales of $1.5 billion in 1959 and is contingent upon settlement of the steel strike. MHI reports that in the first ten months of this year new orders climbed 23 per cent above those in the like '58 period. The industry hit its top sales mark of $1.6 billion in 1956.

• **The Impetus**—"Back of the anticipated sales boost for 1960," says Mr. Fell, "is the renewed emphasis by industry on cost reduction made necessary by higher wage and material costs. Technologically, there is a decided trend toward more completely engineered material handling installations. They tie in with improvements in manufacturing methods resulting from accelerated research and new product development programs."

Price cutting in the industry is declining, the MHI president points out. He feels that prices will advance 2 to 3 per cent in 1960.

MHI has scheduled regional shows in Boston, June 6-8, and in Louisville, Nov. 8-10, next year.

AEC Extends Uranium Pact

The Atomic Energy Commission has extended its uranium concentrate purchase contract with the Bluewater, N. Mex., processing mill of Anaconda Co. more than four and a half years. The new pact lowers production from 3500 tons of ore per day, seven days a week, to 3000 tons, six days a week.

Aluminum Pig Prices Hiked

THE PRICE of pig aluminum was increased 1.3 cents a pound last week. That brings the price back up to the 1957 level. Market observers predict that another 0.5 cent boost may be forthcoming in mid-1960.

The move followed earlier announcement of price increases by Aluminium Ltd., major Canadian producer, in all but the U. S. markets.

Aluminium increased pig prices 0.75 cent a pound and fabricated product prices by 3.5 per cent.

Domestic shipments of aluminum rocketed to an all-time high this year—an estimated 2.4 million tons, 35 per cent above recession-torn 1958.

Consumption this year will end up nearly 17 per cent above the peak set in 1956.

"Shipments in 1960," says Aluminum Co. of America's President Frank L. Magee, "will be 10 to 15 per cent higher than this year's; consumption will jump even more as inventories accumulated as a hedge against a strike are worked off."

Imports were the only blemish on the industry's record. Fabricated product imports in 1959 were double 1958's, reaching a record 60,000 tons.

Secondary producers also predict a better year in 1960.

Carl Burton, secretary of the Aluminum Smelters Research Institute, sees smelter ingot production totaling 400,000 tons next year vs. 350,000 this year.

Grate-Kiln Lines Will Upgrade Iron Ore

EXPANSION of iron ore mining and concentrating operations near Ishpeming, Mich., is announced by Humboldt Mining Co. The company, owned by Cleveland-Cliffs Iron Co. and Ford Motor Co., will install two parallel ore agglomerating lines. Processing equipment will be supplied by Allis-Chalmers Mfg. Co., Milwaukee.

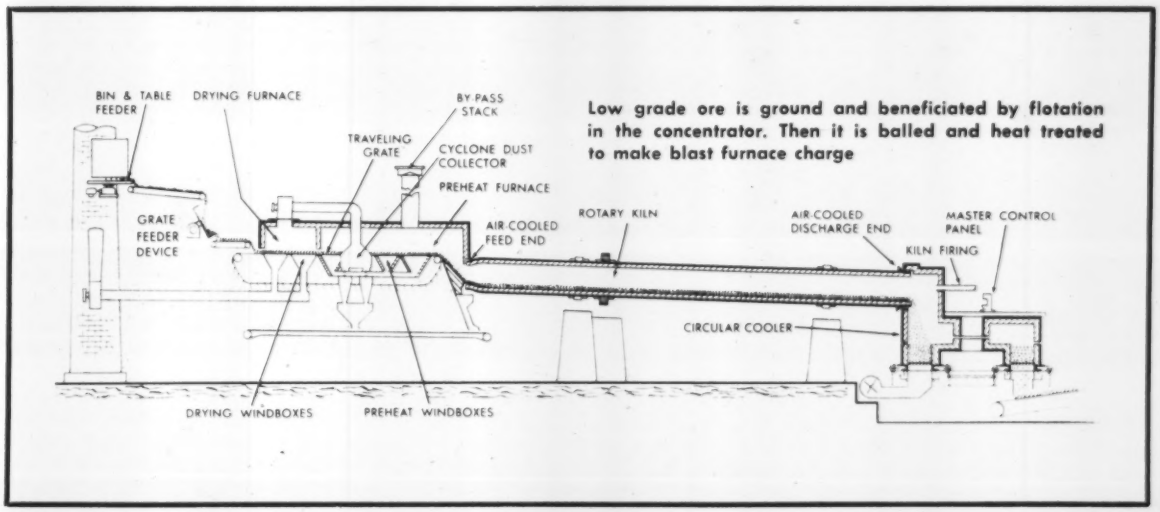
• Success of the process will encourage development of other deposits in the area.

Low grade iron ore such as hematite can't be used economically in its crude form. It must be crushed to fine powder, so oxides can be separated from impurities in a flotation process (specular hematite is a nonmagnetic ore, and cannot be separated from impurities magnetically). Powdered iron ore would be blown out of the blast furnace by the normal draft required for operation. The lines at Humboldt Mining will agglomerate and heat treat the beneficiated, powdered concentrates, forming hard, dense pellets. They are charged directly into the blast furnace.

Each line combines an enclosed, traveling, chain type grate and a short rotary kiln. Concentrates pass through balling drums and over vibrating screens that return undersized balls to the feeders—balls $\frac{3}{8}$ to $\frac{5}{8}$ in. in diameter enter the grate section, then go into the kilns.

Practicability of the system was proved by a year of laboratory and pilot plant operations at the company's test facility.

Humboldt's open pit mine and concentrator are producing 1120 tons of concentrate daily. That output will be doubled to meet the capacity of the new plant which will start producing ore pellets about mid-1960.



Low grade ore is ground and beneficiated by flotation in the concentrator. Then it is balled and heat treated to make blast furnace charge

FOREIGN ROUNDUP
NO. 3

Russia's Challenge

MAKE NO MISTAKE, Soviet Russia desperately wants to outproduce U. S. industry and drive us into an also-ran category in world trade. Such a triumph, she hopes, will lure the have not and fence sitting nations into the Red orbit.

Russia is throwing all her resources into this economic war. From 1951 through 1958, her gross national product grew an average of 7 to 9 per cent annually compared with our 2 to 4 per cent rate.

The projection that the Soviet growth rate will slow to 6 or 7 per cent over the next ten years is scant comfort. Compared with our optimistic 4 per cent projection over the same period, Soviet GNP will increase from about 46 per cent of ours in 1958 to about 53 per cent in 1965.

• **More Significant** — While our GNP is twice that of Russia's, her industry may match or surpass ours in specific target areas. As one Soviet analyst puts it: It's not the size of GNP that's important, but how it's channeled.

Much of our resources go into services and consumer goods. Russia spurns any type of growth that won't strengthen her economic, mili-

How U. S. Stacks Up with Reds*

(Percentages of world production in 1958)

	U. S.	USSR	USSR and Satellites
Aluminum	40.2	15.6	19.4
Coal	16.1	20.4	38.5
Copper (mine)	26.2	12.5	13.5
Copper (smelter)	27.2	11.9	13.4
Iron Ore	17.1	22.0	24.0
Lead (mine)	10.6	13.1	18.6
Lead (smelter)	18.9	13.8	18.8
Molybdenum	72.7	16.4	16.4
Pig Iron (including ferroalloys)	27.2	20.2	25.8
Silver	15.5	10.6	13.6
Steel Ingots and Castings	28.6	20.3	26.5
Zinc (mine)	12.3	12.0	18.7
Zinc (smelter)	26.0	13.4	19.8

Sources: U. S. Bureau of Mines, National Industrial Conference Board.
*Keep these factors in mind when studying the percentages: 1. 1958 was a recession year in the U. S. 2. Russia operates her facilities at 100 per cent capacity. 3. Russia releases no figures on nonferrous metals production; our estimates may have an error as much as 10 to 20 per cent.

'We'll Win in the Market Place'

tary, and political position on the world scene. Witness her gains in missiles and rocketry.

The latest Soviet seven year plan calls for capital investments in the 1959-65 period of $485 billion to $494.5 billion (using the official exchange rate of four rubles to the dollar).

Steel Is King

In no other area is Russia putting greater emphasis than on ferrous metallurgy and iron and steel production. It is the only large industrial power with iron ore, coke, manganese and chromite (world's largest deposits). In 1958, Russia was able to export about 13.2 million tons of iron ore, 925,000 tons of manganese ore, 250,000 tons of chrome ore, and large quantities of coke.

Iron ore reserves have been upped by billions of tons in the last few years. Taconite ores are being mined and processing plants built. Qualitatively, ore reserves (36 per cent average) leave something to be desired. Enough funds haven't been poured into such areas as concentration facilities, but this problem will be largely solved by 1961.

Construction of modern rolling mills has not kept pace with steel production. This is being overcome gradually.

Better blast furnace practices have allowed significant reductions in consumption of manganese. Larger blast furnaces will be built. Already there's one in the range of 2600 cubic yards.

Soviet rolled products mix stresses structurals and rails. Russia would like to buy cold rolled sheets and strip from us. She is desperate for pipe.

If you don't think the Reds' progress is rapid, take a look at probable Soviet 1960 output vs. estimates for 1959:

	1959	1960
	(Millions of tons)	
Iron ore	103.4	115.5
Pig iron	46.6	51.7
Steel ingots	65.1	71.4
Rolled steel	50.9	55.0
Coke	58.3	63.6

• **Machine Tools Up**—Another area where the Soviet bloc outpaces us is in output of machine tools. Since 1955, it has produced more than 100,000 units a year. In 1958, it made 138,000 units, probably about 145,000 this year. Oddly, it still imports jig borers, probably always will. Evidently it's convinced the western countries can do a better job.

Most Russian equipment is modern. The Russians have everything from magnetic tape to punch card controls. Some of their in-plant operations are the most highly automated in the world. In general, they build heavier and larger units than we do.

The bloc is also turning out more extrusion presses. Capacities range up to 22,000 tons. It's producing hydraulic presses up to 77,000 tons constructed from prestressed, reinforced concrete.

Nonferrous Boosted

Since World War II the Russians have been successful too in nonferrous metallurgy and minerals exploration.

Nonferrous expansion forms an odd picture though. The bulk of Russia's mineral deposits is in Soviet Asia. But most of the processing plants are in European Russia. In many instances, the Soviets mine such low grades and in such remote areas that it appears they are trying to become self-sufficient regardless of cost.

• **Aluminum** — Reserves of high grade bauxite are limited. This has caused the Soviets to import large quantities from Hungary and Free World countries such as Greece. To get enough raw material, the Russians have had to resort to beneficiating nephelite. This is economically feasible only because they are able to recover 1 ton of potash and 7 tons of aggregate for cement along with each ton of alumina.

Their long range planning to step up aluminum output is based primarily on the mining of nephelite. Bulk of the new reduction plants will undoubtedly be set up in Soviet Asia. There are persistent reports of widescale construction of hydroelectric facilities in this section.

Russia turns out 600,000 to 700,000 tons of aluminum a year, less than one-third of U. S. primary capacity and only about 25 per cent of U. S. primary and secondary capacity combined. Red leaders are pushing aluminum production and fabrication in the European satellites and all but Albania and Bulgaria produce some metal. Satellite capacity is 150,000 tons. Breakdown: Czechoslovakia, 29,000; East Germany, 40,000; Hungary, 44,000; Poland, 25,000; Rumania, 12,000.

• **Tin**—Production is on the upswing. Several new ore dressing plants have been built recently in northern Siberia but over the long haul the bloc may run a little short from time to time. The Soviets probably produce around 15,000 to 20,000 tons yearly and import 20,000 tons from Red China. Last year, they exported around 24,000 tons and created a furor on the tightly controlled Free World market. They've since agreed to limit exports to 13,500 tons a year.

• **Copper**—Russia is hurting badly. Reserves are sparse, particularly in the satellites, with only Bulgaria contributing a significant amount. The Soviets are mining 1 per cent (and less) ore and have so far seemed unwilling to invest large sums in copper processing facilities. Possible reason: Copper may be the victim of the tight money situation inside Russia brought on by the feverish industrial expansion.

Some reports indicate that Russians are frantically building plants to process low grade copper ores, but they'll have to rely upon imports for the foreseeable future.

• **Zinc**—Soviet production probably runs between 330,000 and 385,000 tons a year. In addition, about 100,000 tons of concentrate a year are imported from North Korea, smaller quantities from Poland and Bulgaria, and some semifabricated

material from Poland. In 1958, the Soviets exported 42,000 tons of zinc to the Free World.

The seven year plan calls for a 60 per cent increase in Russian zinc production, but consumption may rise so much faster (it currently stands at 330,000 tons a year) and they will become an even bigger importer.

• **Magnesium**—Russian production is about the same as ours (43,000 tons in 1958).

• **Tungsten**—The USSR has substantial production and draws on Red China for additional quantities. Some is exported.

• **Nickel:** Reserves are probably adequate but present availability is a little on the tight side.

• **Molybdenum:** Russia has little of her own but she is drawing on China for increasing quantities.

• **Precious Metals:** Russia is among the world's biggest producers of the platinum metals. Her gold output runs around 10 million ounces a year and is valued at $350 million. The Soviet gold stock is estimated at 240 million ounces worth about $8.4 billion.

• **Other Metals**—The Russians have zirconium in sufficient quantities and reportedly are doing some advanced work with titanium. They are working hard on the whole range of high temperature metals and are probably just about even with us. Cobalt supply is short.

• **Power to Go On**—The ambitious projects of the seven year plan will require lots of power, and the Russians have it. The bloc has unlimited sources of peat, produces 50 per cent of all coal mined, and holds the world's largest reserves. It has oil for its own and export needs and plans to double production within the next seven years, has plenty of natural gas, more water resources than the U. S., and is doubling output of electric power by 1965 a prime goal.

The Satellites

Growth of the East European satellites is increasing. But problems will exist. Capital will be hard to get. Cost per unit of output in terms of investment will probably increase. New additions to the labor force are slowing.

Look for more specialization despite satellite pleas in the past for increased diversification.

• **Steel Up**—In 1960, satellite steel production should hit around 22 million tons, triple that of 1948. By 1965, output should be at 33 million tons.

Poland is the largest producer, with Czechoslovakia the runner-up. But the Czechs should take over the top spot next year and hold it through 1965. Both countries will continue to ship steel to the Free World.

Poland has the only continuous strip mill in the bloc. Czechoslovakia is planning a high speed strip mill and Hungary expects to complete one by 1963.

After 1960, Czechoslovakia plans to build no more open hearths. She will use oxygen converters instead. Poland plans to step up her oxygen facilities.

Czechoslovakia and East Germany enjoy the highest standard of living among the satellites (even higher than the USSR). Poland and Hungary are next. But the relatively undeveloped countries of Bulgaria, Albania, and Rumania are growing fastest.

Tub Thumping for Trade

Though still small as a trader, the Red bloc is making a bold bid for a larger share of the world market. For example: In 1958, the Soviet Union accounted for $8.7 billion of the world trade total (imports and exports) of $213.3 billion. (U. S. imports and exports were $30.7 billion.) About two-thirds of this trade was with the satellites. Together, Russia and the satellites traded about $6.1 billion with the Free World.

Trade with the Free World this year is running about 15 to 20 per cent higher. During the first six months, Italy imported $33.3 million from the Soviet Union compared with $14.5 million last year. Over the first nine months, Great Britain sold the Reds $62.5 million worth of goods.

You will find that the same pattern holds true in the U. S.: Through the first three quarters, we imported $21.8 million from the Soviet Union while exporting $4.2 million. Comparable figures for last year are $13.9 million and $800,000.

• **Significance**—Don't just look at the total value of Red trade as an indication of its importance. The bloc may represent a significant force of trade. Finland and Iceland, for example, import nearly all their petroleum products from the Soviet Union. Russia and the chief satellite exporters (East Germany, Czechoslovakia, and Poland) have built up a rapidly expanding export business with such underdeveloped nations as Afghanistan, Egypt, India, Malaya, and Uruguay.

• **We're Wanted** — The nut the

What the Soviets Say They'll Do . . .

"In the course of seven years (1959 to 1965), Soviet industry will produce as many goods as were produced during the whole of the preceding period. The national income of the USSR for the next seven years will equal the whole of the national income of the country during the last 30 years. By 1968-70 the USSR will also have surpassed the U. S. in per capita output of industrial goods." — N. S. Khrushchev, November, 1959.

Principal Targets of the Seven Year Plan* . . .

	1958	1959	1965
Pig Iron (million net tons)	43.6	46.6	71.6-77.0
Iron Ore (million net tons)	97.7	103.4	165.0-176.0
Steel Ingots (million net tons)	60.4	65.1	95.0-100.0
Rolled Steel (million net tons)	47.2	50.9	71.6-77.0
Coal (million net tons)	545.6	554.4	661.0-674.6
Oil (million net tons)	124.3	135.8	253.5-264.0
Gas (billion cubic meters)	29.8	35.0	150.0
Electric Power (billion kw-hr)	233.0	252.0	500.0-520.0
Metal Cutting Machines (units)	138,000	—	190,000-200,000
Forge & Press Machines (units)	—	—	36,200
Motor Vehicles (units)	511,000	483,000	750,000-856,000
Appliances, Radio, TV (units)	5,798,000	6,510,000	13,300,000

*Some of the targets for 1965 have been significantly downgraded from prior estimates.

Soviet trade bosses most want to crack right now, though, is the U. S. They want from us equipment for the production of synthetic fibers, chemicals, foodstuffs, and castings, as well as certain types of machine tools, mining machinery, steel pipe and tubing, stainless steel.

In return, the Soviets have talked most about shipping us foods, wines and liquors, furs, raw materials, and machine tools. But a representative of the Soviet embassy told STEEL they are willing to export most anything to the U. S., "including jet airliners."

As yet, it doesn't look like our official attitude of limiting trade with the Reds will change. But a growing number of U. S. businessmen are taking public exception to this policy. The American Management Association held a seminar on the subject in New York earlier this month. Consensus: "It makes little sense that we should make the vain attempt to withhold goods which everybody else is willing to supply to the Communists."

Red bloc trade with the western world is conducted primarily with commercial motives. It wants goods which are either not available from domestic sources or which can be had only at prohibitive cost.

Another reason says one analyst: Political motivations have a place in all Communist trade. Soviet leaders are aware of trade as a lever for rewarding friends, punishing enemies, and promoting Communist goals.

• **Bait**—In a few cases, the Reds deliberately sell at a discount to penetrate a market. In other cases, they pay premiums to acquire some badly needed commodity or to provide the basis for exports, but when premiums are paid the goods are generally overpriced.

Turbine-Generators Fall Below '58 Pace

SHIPMENTS of steam turbine-generators this year slipped 20 per cent below 1958 volume, but it will be the second best year in the industry's history.

Volume dipped to $300 million this year and is expected to drop even farther in 1960 and early 1961 as a result of the 1958 recession—long leadtimes are involved. An upturn in placement of new orders in the second half of 1959, however, should mean a lift for shipments in late 1961 and 1962, says the Business & Defense Services Administration.

Another boost for domestic manufacturers may also come from recent steps to make the industry more competitive with foreign producers for U. S. government business. Price reductions by some domestic producers, coupled with price allowances permitted in the Executive Order prescribing purchasing procedures under the Buy American Act, will reduce effective price differentials. This year the government placed orders for 500 megawatt units with foreign manufacturers because of the price differential.

Steam Turbine-Generator Shipments (1000 Kilowatts)

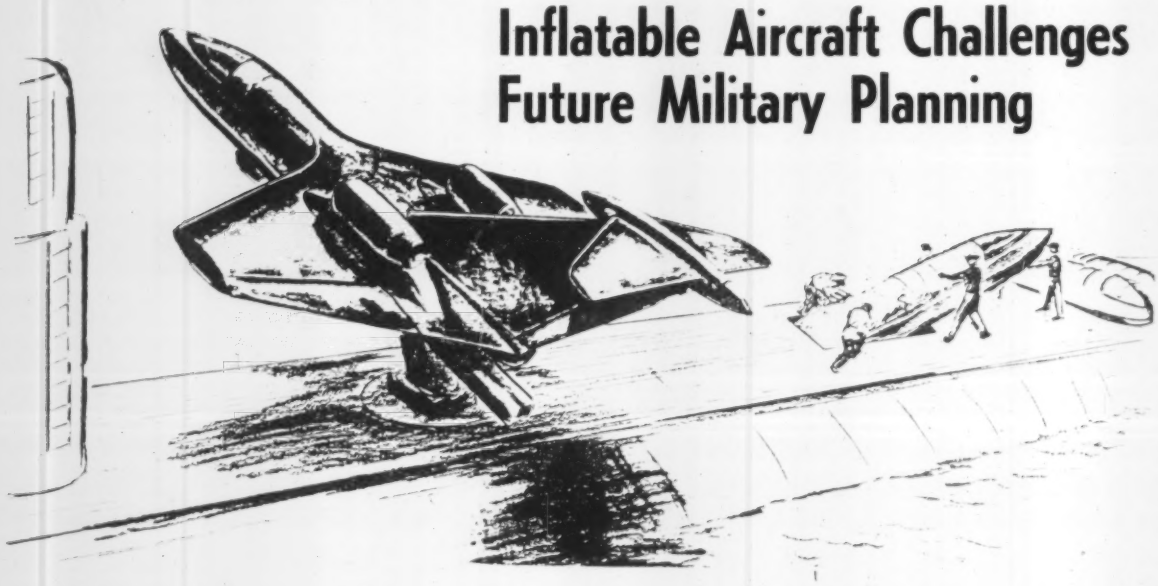
1955	9,200
1956	7,600
1957	12,200
1958	15,600
1959 (est.)	12,500
1960 (est.)	9,600

Imports Double '58 Level

Imports of steel mill products maintained their lead over exports for the eleventh consecutive month in October, says the Business & Defense Services Administration. Imports had a 2 million net ton edge in the first ten months of the year.

Imports through October totaled 3.4 million tons, twice the quantity imported in all of 1958. During the steel strike, imports accounted for about 25 per cent of the new supply of steel in the U. S. Exports through October totaled 1.3 million tons, the lowest rate since 1936.

Inflatable Aircraft Challenges Future Military Planning



HERE'S the hottest story developing at the Pentagon: Some material specialists and tacticians are trying to convince top brass that an inflatable airplane is this country's best answer to the Russian missile threat.

Known as Project Wagmight, it is described by an authoritative source as a "missile-aircraft" capable of 500 mph within a 1500 mile range. (It has a 20 ft wingspan and is 39 ft long.) The hydrogen bomb carrying craft would be propelled by two, standard jet engines and could be launched from a surfaced submarine, any ship, or even a large truck.

The wing, fuselage, and cockpit would be constructed of neoprene coated nylon cloth. The powerplant and landing gear would be the only rigid components. The plane would be stored in a cylinder about 4 ft in diameter and 23 ft long. It could be inflated with air and prepared for flight within 30 minutes.

A jet engine compressor would provide air during flight to main rigidity. Several hundred punctures would not knock it out of the air.

Wagmight Termed Feasible

Following revelation of the secret project in Washington last week, the Pentagon fastened the news lid. STEEL learned, however, that the Navy regards the project as technically feasible and made a presentation to the Defense Research & Engineering Office last June. Officially, the Defense Department says it has no position on Wagmight, has not spent any money on it, and is not prepared to discuss it. Advocates of the project claim production could begin within one year if the go-ahead were given today. (But it is reliably reported that the project may already be bogged down in interservice politics.)

The project, if feasible, would obviously add tremendously to this country's defense capabilities. The cost of producing a number of the planes would obviously be far below that of similar weapons made of conventional materials.

Effects on Industry

Obviously, Wagmight would have important effects on metalworking's position in defense markets. While the Pentagon has stopped buying fighter aircraft, it will still spend hundreds of millions on bombers for the Strategic Air Command in the next two or three fiscal years—but it seems logical that the number needed would be reduced if Wagmight were produced in quantity.

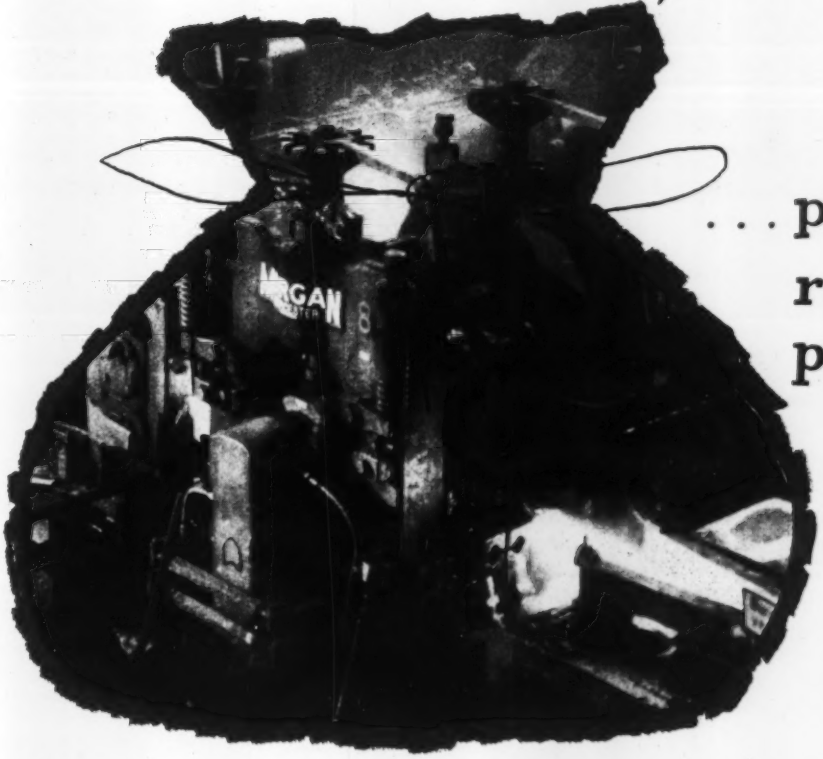
The craft can be used as a drone, or operated by a pilot at low altitudes. It would be catapulted into the air with a jet assist system, somewhat like a missile, and could approach its target without fear of detection because the nylon would not reflect enemy radar.

A Pentagon source, while refusing to elaborate on the project itself, advised STEEL that "this is quite a concept." Another warned: It is so simple, the Russians surely must have considered it.

The most official Defense Department sources will admit that there is "considerable doubt about the feasibility of the project." That probably means there is considerable tugging and pulling within the Pentagon to either kill it or get it underway.

The Army, it is reliably reported, has seriously considered ordering a large number of a Goodyear inflatable plane, which, when packaged, is small enough to carry under your arm. The plane is regarded as the predecessor to Wagmight. Its success (at least two have been built and flown) is proved.

to turn ideas into...



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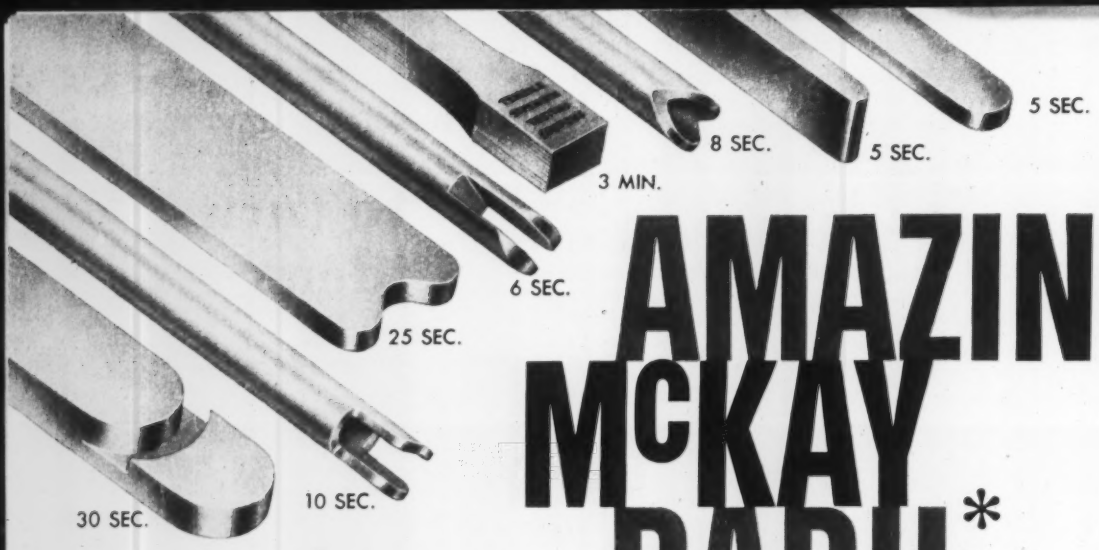

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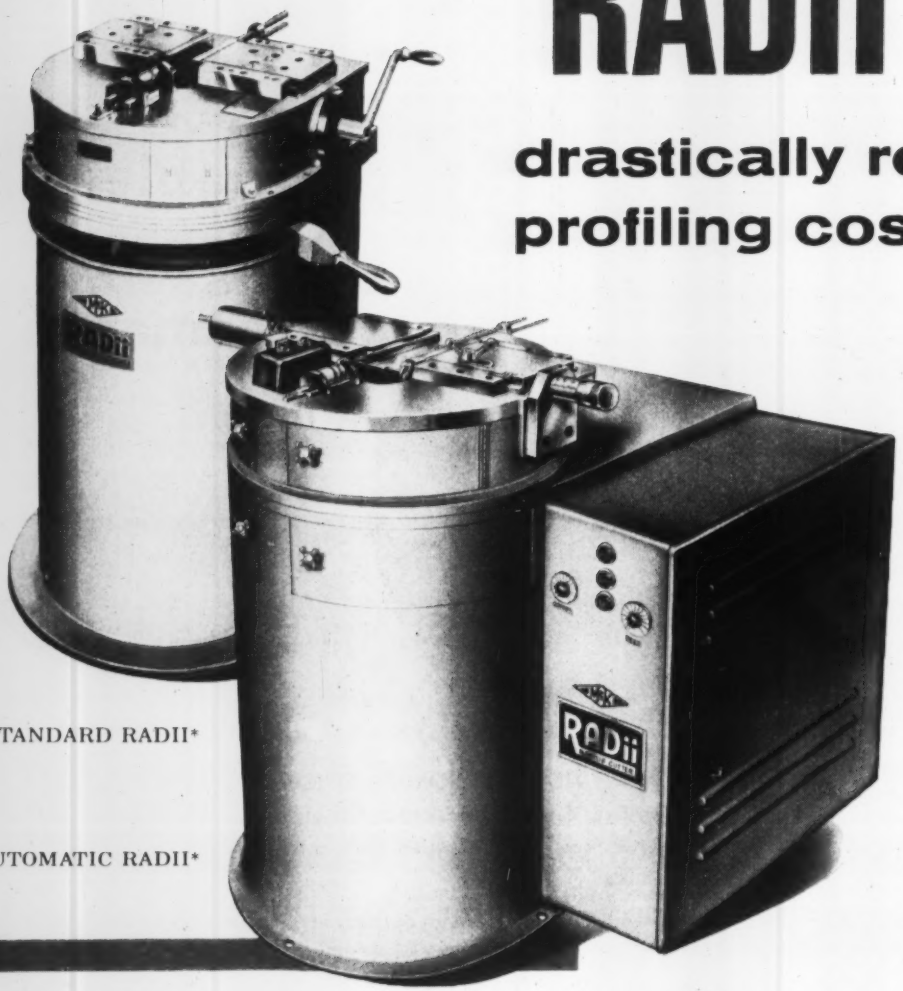

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For literature or further information on this outstanding cost-cutter write *McKay Machine Company, Youngstown 1, Ohio.*

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Welding Electrode Market Rebounds

WELDING ELECTRODE producers are marking up sales gains over 1958 (despite the beating they took during the strike) and are predicting further increases for 1960.

A STEEL survey of leading producers reveals that companies are enjoying sales boosts of 10 to 50 per cent above 1958 volume. The same companies are forecasting 1960 business at levels 10 to 25 per cent higher than this year's. Behind the forecasts: Strike-born backlogs of up to 200 per cent of the year-ago level.

While the longest steel strike in history has cut production (many electrode plants are operating at 40 to 80 per cent of capacity), plant inventories have also fallen 15 to 50 per cent below their year-ago levels. A resumption of the steel strike in January, or a national railroad strike later in the spring, would put a substantial crimp in the industry's 1960 volume.

Electrode Shipments*

(Millions of pounds)

	1960	1959	1958
Mild Steel	716.1	608.7	401.8
Alloy	85.0	72.3	51.5
Nonferrous	2.5	2.2	1.3
Totals	803.6	683.2	454.6

*STEEL's estimate.

• Some of the industry's optimism is pinned to an upturn in 1960 industrial construction.

Charles Herbruck, assistant secretary, Lincoln Electric Co., Cleveland, predicts that a recovery in industrial construction will provide his company's biggest market growth next year. It's a market which will probably boost all types of welding equipment; the Business & Defense Services Administration predicts that nonresidential, commercial, and industrial construction will climb 19 per cent next year to a value of $10.2 billion.

Other growth markets pinpointed by producers: The automotive industry, shipbuilding, railroad carbuilding, earth moving equipment, tank manufacture, ferrous and nonferrous fabricators in general.

• Fierce price competition remains an industry headache. A steel price rise next year would hurt.

None of the respondents to STEEL's survey indicated that he would raise prices in the immediate future. One copper electrode maker reported a 5 per cent price increase in the past year; two others said they had cut prices on mild steel types in the last year—10 and 12 per cent. A lot of the industry's attitude is probably summed up by David Champion, general sales manager, Champion Rivet Co., Cleveland: "Sales are not the problem—it's the damn profit."

R. E. Roediger, electrode sales manager, Hobart Bros. Co., Troy, Ohio, adds: "Severe competition has restricted profits to manufacturers and distributors of welding electrodes to the point where research and development will soon be adversely affected."

Electrode producers are not facing any substantial competition from imported electrodes or electrode wire. Only one of STEEL's respondents reported buying foreign electrode wire—and in only nominal quantities, he says. However, it is thought that some producers are considering setting up foreign plants, particularly in South America. Eventually, it's quite possible that these plants would start shipping products into the U. S., say some welding people.

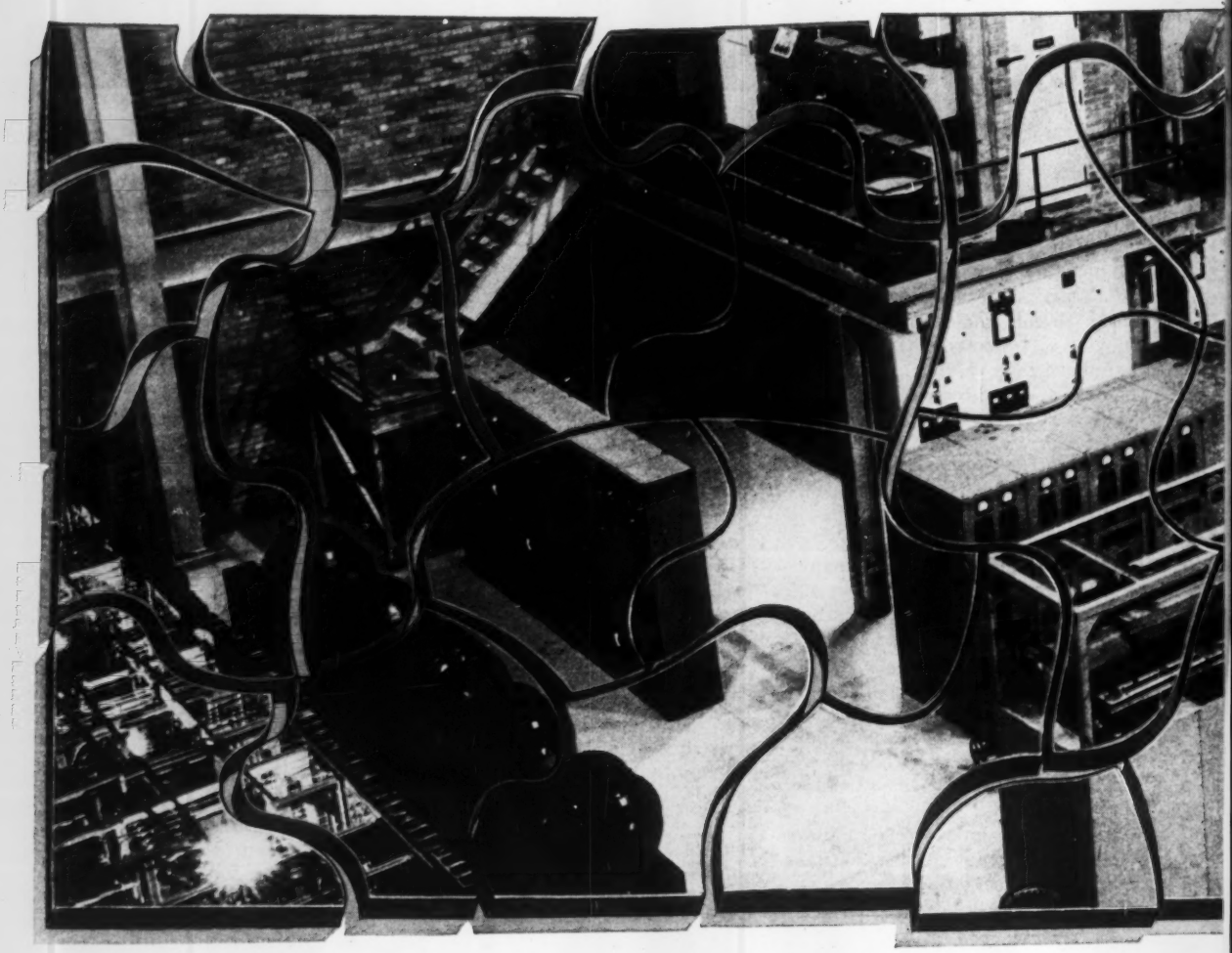
• Low hydrogen, iron powder electrodes are one of the best sellers.

More low alloy steels being used require low hydrogen electrodes, says Mr. Roediger. He adds that demand for Type E-7018 now exceeds supply.

W. E. Claflin, manager of the Weldrod & Wire Dept., Ampco Metal Inc., Milwaukee, predicts faster growth for bare rods and spooled wire for inert gas welding. Mr. Herbruck, Mr. Champion, and many others say that development of new processes will advance the growth of automatic and semiautomatic welding.

Richard W. Raney, general sales manager of the Welding Products Div., A. O. Smith Corp., Milwaukee, believes that automatic carbon dioxide welding will become an important technological development. Also in the development stage is a cored rod, with the coating inside, which is expected to hike welding speeds and cut labor costs.

F. E. Abbott, Linde Co., a division of Union Carbide Corp., foresees a growing demand for automatic welding wire in small coils (1 to 4 lb) for the processing of the more exotic and hard-to-weld metals, such as stainless steels and titanium alloys. "In terms of total poundage, the items will probably not constitute a significant fraction for some time to come, but they represent something basically new which is bound to grow at an accelerating rate," he says.



WESTINGHOUSE ANNOUNCES A NEW INDUSTRIAL CONTROL COMPUTER

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As late as yesterday, management men who looked toward automation also saw a dilemma. One alternative—all-out conversion to computer control—demanded expenditures rarely practical except for major expansion. The other—piecemeal addition of components—led inevitably to an uncoordinated system and partial loss of investment.

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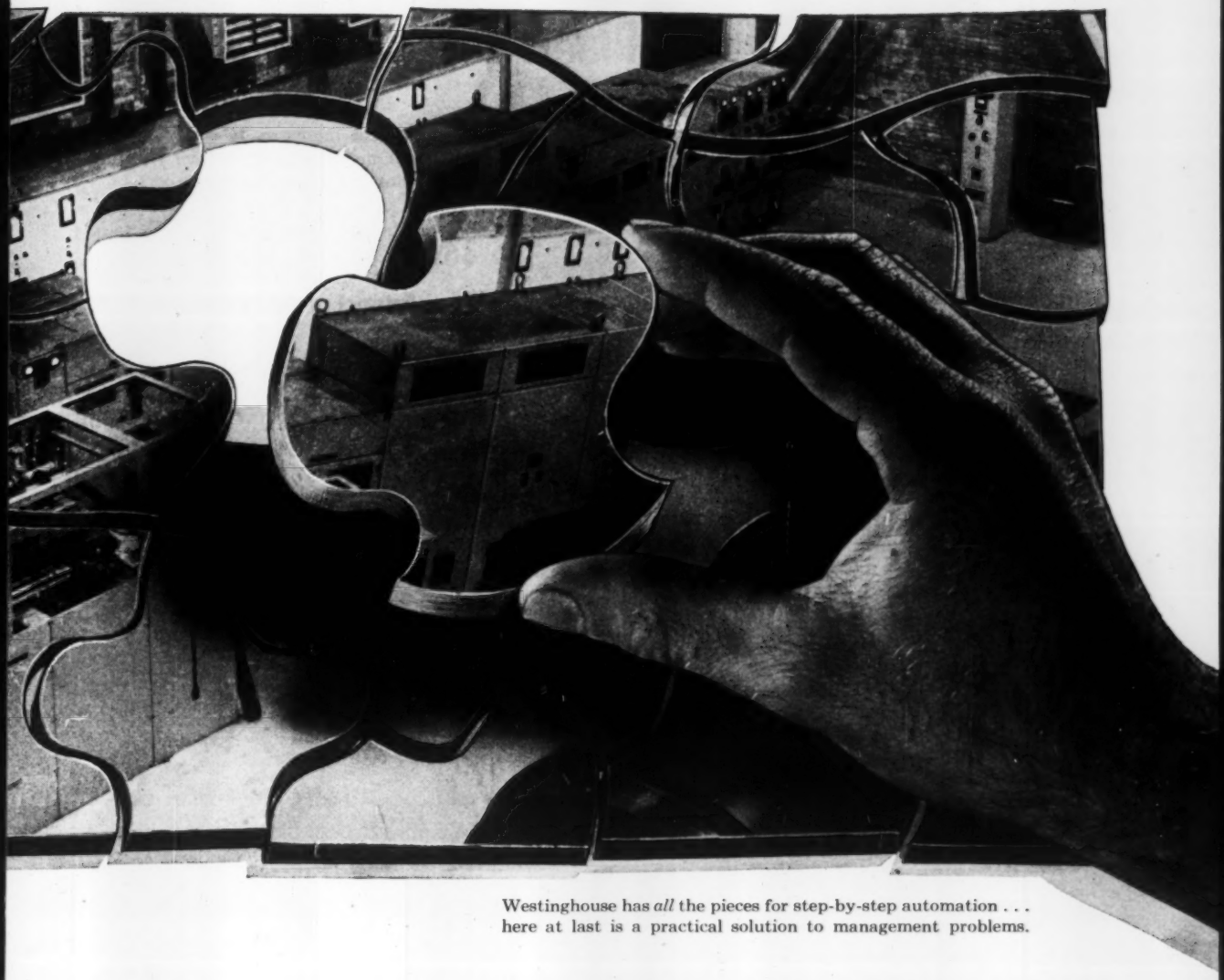
For years, Westinghouse PRODAC* control has been used economically to automate specific mill operations . . . such as blooming mills, slabbing mills, reversing roughers, ingot buggy operations, stock house ma-

*Trade-Mark



Westinghouse has *all* the pieces for step-by-step automation . . . here at last is a practical solution to management problems.

possible fully automatic production

terials handling and many other mill applications.

To enable you to "close the loop" for complete automatic mill operation, Westinghouse now adds PRODAC industrial computer control. This new computer control is designed to work in unison with every other item of Westinghouse control equipment. Existing installations already incorporate the flexibility required for completing your automation plans. In this way, step-by-step automation becomes a practical and economical reality.

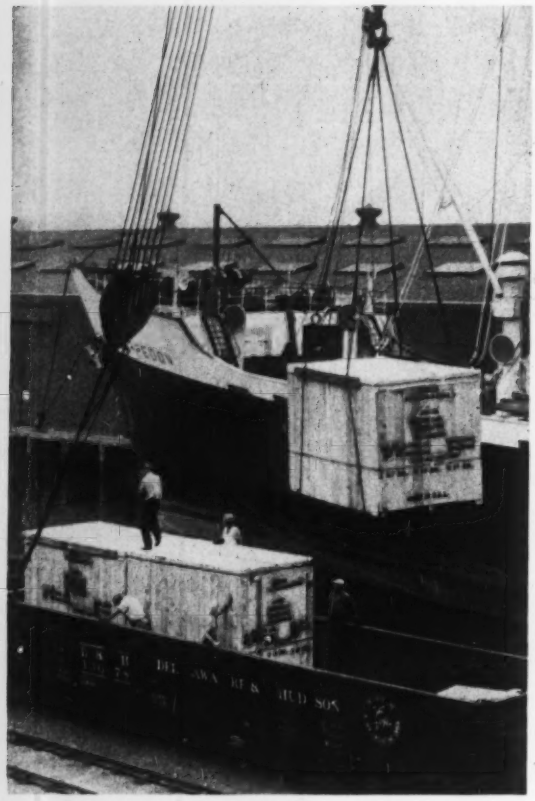
The entire team of Westinghouse PRODAC engineers is at your service to help you determine exactly where and how PRODAC can benefit you. Your Westinghouse sales engineer can give you complete information, or write to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

J.22111

YOU CAN BE SURE...IF IT'S Westinghouse

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV ALTERNATE FRIDAYS

43.3% of Metalworking Plants Produce for Export



STEEL asked 7500 plant managers to compare their outlook for dollar volume of exports in 1960 with '59 performance. Of those who produce for export . . .

36% Expect an increase

15% Expect a decrease

49% Expect no change

Changes Expected, By Major Industry Groups:

Primary metals	−0.8%
Fabricated metal products	+2.0
Machinery (except electrical)	+0.9
Electrical machinery	+2.0
Transportation equipment	+3.6
Instruments & related products	+2.5
Other metalworking groups*	−0.5

By Size of Plant

Plants employing 20 to 99	+0.9
Plants employing 100 to 499	+1.9
Plants employing 500 or more	+1.5

Export Markets: Harder to Crack

A MEAGER 1.4 per cent is all that metalworking will gain in export volume during the coming year. Such is the consensus of respondents to a STEEL survey of 7500 plant managers (43.3 per cent of them produce for export. Projected, that means 13,400 U. S. metalworking plants sell their products abroad).

Since metalworking sales are slated to rise about five times as much, percentagewise, as export volume, it means the metalworking industries will ship a smaller percentage of their output abroad in 1960 than they did in 1959. And '59 has been a poor export year; in most categories (see table) it lagged '58.

• **Most Optimistic** — Makers of transportation equipment look for the biggest gain in exports next year—3.6 per cent. That's partially due to compact carmakers' beliefs that they can regain a small portion of the world markets they've lost to European auto producers.

• **Least**—The dimmest outlook is taken by producers of primary metals. They anticipate an 0.8 per cent decline in export volume next year —on top of a deep erosion in '59. Steelmakers will be hardest hit. Not only are they being pushed out of the export market by foreign competitors with low wage rates, but they are losing a sizable portion of the domestic market to the foreign producers. They've been forced to watch foreign steel being unloaded in the heart of America while their own producing facilities were idled by a strike. They're not sure how many of the lost customers they'll be able to win back—even though steel users have vehemently supported steel management's stand.

• **Have Fought, Will Join**—U. S. machinery makers predict slight gains in their export volumes next year. But they've taken, for the most part, a different tack to remain competitive in world markets: Instead of exporting machines, they're exporting capacity. A National Machine Tool Builders' Association survey (see STEEL, Sept. 28, p. 84) shows that 39 build-

We Sold Fewer Products Abroad in '59

	(Millions of dollars) First eight months 1959	1958	Percentage change
• Iron & steel mill products	296.5	382.8	−23
• Metal manufactures	294.8	317.8	− 7
• Nonferrous metals & ferroalloys	193.5	199.3	− 3
• Electrical apparatus	498.0	507.0	− 2
• Power generating machinery	162.9	162.6	0
• Construction & mining machinery	465.3	479.8	− 3
• Metalworking machinery	216.8	219.9	− 1
• Office machines & parts	91.8	87.4	+ 5
• Agricultural implements	108.5	90.8	+19
• Tractors, parts & accessories	243.4	228.1	+ 7
• Automobiles & accessories	772.7	740.4	+ 4
• Aircraft & aircraft engines	80.8	172.0	−53
• Railway transportation equipment	61.3	136.4	−55
• Photographic equipment	72.7	69.9	+ 4
• Instruments	64.4	65.5	− 2

Source: Department of Commerce.

ers with 43 per cent of U. S. capacity have made arrangements to produce machine tools abroad; at least 20 more firms are planning such moves.

• **It's the Trend**—Expect more companies in other industries to do that. Direct investments in foreign facilities have more than doubled since 1950. One firm that has been successful in a foreign operation is Champion Rivet Co., Cleveland. It owns a plant making welding electrodes in Mexico. Let D. J. Champion, general sales manager, tell you why his firm is investing in foreign facilities:

"American Welding Society standards, like other American manufacturing standards, have long enjoyed a fine reputation around the world. That gave American manufacturers a marketing advantage. Now European and Japanese firms meet those standards—and at a lower price. The only way to beat that type of competition is to set up plants abroad. Our plant in Mexico is operated by the local people. They do a U. S.-style job."

• **They're Imaginative**—Some foreign firms are beating out their U. S. competitors on more scores than just price. Says Mr. Champion: "Europeans have superb marketing and production ingenuity. For example, on a construction job in Mexico, a German company saved some of the German steel plates being used on the project, rolled them into rods, and coated them. Result: Electrodes that better matched the specifications for the job than anything we could produce in the conventional manner. And the German price was lower than ours."

• **Take Tips from Them**—"We can learn marketing techniques from the Japanese and Germans," says Mr. Champion. "Their trade fairs are fantastic. And their governments encourage exporting more than does the U. S. government. England, for example, does this: When a British subject engaged in export trade locates in another country for a long period, he becomes a citizen of that country, with all the rights of citizenship. He pays no taxes to Great Britain. But when he returns to England, all is forgiven; he is automatically a British subject again. In many such matters, the U. S. attitude is stupid compared with the European."

The citizenship arrangement can be an important factor in the success of your overseas operations. In Mexico, for example, no foreigner can own property within 50 miles of a coast line, Mr. Champion reports. So the English fellow can buy a house there. The American can't. The American also faces irksome travel restrictions. More important is the attitude of the foreign populace. "They're more likely to accept the man who becomes one of them," says Mr. Champion.

• **Where You're Ahead** — Ray R. Eppert, president of Burroughs Corp., Detroit, says his firm's overseas business this year will be about 1¼ times its total corporate sales 12 years ago. "Although their labor costs are considerably below ours, foreign companies feel the need to control them. So they're mechanizing methods and procedures," says Mr. Eppert. Burroughs has production facilities in several foreign countries. It imports some things from itself. Says Mr. Eppert: "That puts us in a better position to export newer items to them. This arrangement protects our employees' jobs in the U. S. and creates more jobs abroad." He thinks more and more firms will set up such global networks as the European common trade blocs develop (see STEEL, Dec. 14, p. 64).

• **A Bit of Aid**—Look for England to further weaken its import restrictions. That will assist many American metalworkers in their export marketing. Example: J. A. Robinson, president, Acme-Lite Co., Chicago, looks for a big increase in export volume next year, largely due to England's reduction of import blocks on photographic goods.

BULLARD

"H.B.M., Model 75 is better than any other machine we've ever seen."

This statement by Mr. John Gruber, Plant Foreman of George Hantscho and Company, Inc., Mount Vernon, New York, manufacturers of printing equipment, sums up their experience since installing the Bullard 4" H.B.M., Model 75, in June 1957.

He further states "our presses and paperfolding machines are made to order and each job varies from the one before it. Because of this, we can't use assembly line or mass production techniques."

"The only mass production we have is the machining of holes in cast iron, up to as many as 105 in a side frame. Since we've been using our Bullard H.B.M., Model 75, with BULLARD AUTOMATIC POSITIONING we have not spoiled a single piece due to the malfunctioning of the machine."

Do you know the full story on the Bullard H.B.M., Model 75? If not, it will pay you to call your nearest Bullard Sales Engineer — he'll be glad to give you all the details or write

THE BULLARD COMPANY BRIDGEPORT 9, CONN.

Car Prospects Delay Buying Until 1960

DEFERRED PURCHASES make the 1960 car market look like a boom one. The Commerce Department already has estimated 6.7 million automobiles will be sold next year. Automakers suspect the total will be higher. L. L. Colbert, Chrysler Corp.'s president, said yesterday that if no unforeseen economic blocks develop, 1960 sales including imports will reach and probably will exceed 7 million units.

Nineteen fifty-nine is closing out at a slower pace than dealers had hoped for after the spring sales resurgence. The industry initially projected sales at 5.5 million units, plus half a million imports. Then a strong recovery from the recession led to revisions upward toward 6.2 million. The steel hassle has pushed the figure back to original estimates. Total registrations (including imports) apparently will be about 5.9 million. That compares with 4.6 million in 1958 and 5.9 million in 1957.

New Market Breakdown Shows Utilitarian Shift

(Percentage of registrations)

	1959*	1958	1957
Imports	10.5%	7.9%	3.3%
Compacts	13.2	4.5	2.3
Convertibles	4.7	4.4	4.1
Wagons	19.4	16.6	13.6
Luxury Cars	5.8	5.4	5.3
Standard Cars	53.9	65.6	76.5

* Preliminary. Adapted from *Ward's Automotive Reports.*

• **Ford Wins**—There's little doubt that Ford will beat out Chevrolet in the 1959 sales race. The GM division has been handicapped by lack of steel. At the end of 11 months, Ford showed sales of 1.33 million units; some 5000 more than Chevrolet. It probably will finish the year with that margin. In November, Ford sold 128,000 cars to Chevy's 74,000. The GM producer didn't get back in operation until three weeks ago.

• **Imports Hold** — Despite some wishful thinking on the part of domestic manufacturers, imports have not yet fallen off. They're taking less of the economy car market, but that was expected as Corvair, Falcon, and Valiant moved into competition. But import sales should total near 600,000 units this year to take 10 per cent of the total market. That's a 3 per cent increase over 1958 penetration. More than $700 million worth of imported vehicles will be sold in the U. S. this year.

Volkswagen's lead in the import field is seriously threatened by Renault. The French producer has a slight price edge on VW. It plans a 30 per cent production hike in 1960. VW plans to expand its model lines; may make some slight styling changes. Here's how the struggle between the two has gone since 1956:

U. S. Import Sales

(Thousands of units)

	VW	Renault
1959*	108.0	90.2
1958	85.7	46.6
1957	70.9	21.5
1956	47.0	2.3

*Estimated.

• **Compacts Hot**—Detroit apparently has hit the marketing research bull's-eye with the compact cars. Sales have climbed steadily despite shortages in some lines due to lack of steel. The five compact makes are a cinch to take at least 25 per cent of 1960 sales, the industry thinks.

As expected, the lowest price Fords, Chevrolets, and Plymouths have been most affected by the new cars which compete with them in price. Ford Motor Co. surveyed 6000 Falcon buyers among the 42,500 purchasers who bought that economy car between Oct. 7 and Nov. 30. During that time, sales of lowest price, standard cars dropped from 52.4 to 44.4 per cent of the market. The survey also showed that 41 per cent of the Falcon buyers would not normally have bought new cars at this time. It also appears that compacts will increase the number of two car families. Twenty-one per cent in the Falcon survey offered no trades. Half of those were keeping their present cars and adding Falcons.

Competition already is keen among the smaller cars. A race has developed between Falcon and Rambler. Ford built 32,469 Falcons in November vs. AMC's 35,905 Ramblers. The previous month, the margin was 37,000 Ramblers to 21,000 Falcons. More significant are sales reported from Indianapolis, a trend setting market area. Indianapolis dealers sold 145 Ramblers and 122 Falcons in November. Valiant and Corvair won't be contenders until they build up enough

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Like to Drive?

How about two weeks' free use of a Thunderbird or any other of the 19 cars made by Ford Div.? For the how-to, turn to the Servicenter, Page 5, for rules and an entry blank.

units to make a strong entry. Only 78 Corvairs were registered in the Indianapolis area last month.

• **Segmented Market**—As the compacts move into the market place, Detroit is scrapping its old method of measuring competition in terms of price groups. Low, medium, and high price cars have given way to the "segmented" market concept based on the function the car will perform. Don Peterson, Ford's car planning manager, explains how his company looks at the changing market:

"The automobile customer hasn't changed and doesn't change with time; he simply responds to different buying demands. Today, he's offered a more diversified market and this means we'll have more varieties of cars in the future." He claims there will be nine different segments in the upcoming car market.

First comes the small economy car in the $1900 and under price group. Most of them are imports.

Next are the compacts. They can hold six passengers, give better than 20 mpg, but are not considered "inexpensively priced," says Mr. Peterson. He believes this will be the fastest growing segment of the market.

The third group consists of Ford, Chevrolet, and Plymouth. Mr. Peterson calls them "basic transportation" vehicles to distinguish them from the fourth group, "style conscious" cars, formerly considered medium price automobiles.

The luxury car class has pretty much telescoped itself into Cadillac, Lincoln, and Imperial, although some manufacturers and marketing people still put Chrysler's New Yorker and Buick's Electra 225 in this class too.

While Mr. Peterson feels the Thunderbird is in its own "specialty car" class, other researchers think it belongs in the luxury group. There are some indications that Ford intends to move it more definitely into the luxury class by 1962.

The three other types of automobiles in Mr. Peterson's breakdown are station wagons for functional uses, convertibles, and sports cars. Each type fills specific buyer demands. In the chart (Page 67), STEEL has broken down registrations for the last three years into some of the more commonly agreed upon market segments. It's apparent that the standard cars which now include Ford, Chevrolet, and Plymouth, are taking a smaller slice of the market.

• **Squeeze Play On**—Look for one or two makes of cars to drop out of the standard group as more sales pressure is applied to cars in the $3000 and up price groups. Edsel is gone. Chrysler denies it will drop Dodge, but motordom still thinks it will phase out the Matador and Polara series and put the Dodge name on the Dart series. It's difficult to see how 10 or 11 makes of cars that used to account for more than 90 per cent of the market all can survive on less than 60 per cent.

Buick, Oldsmobile, and Pontiac apparently will thrive. Those three GM makes took 41.6 per cent of the so-called medium car output in the 1959 model run and topped the Ford, Chevrolet, and Plymouth high price series for the first time. Ford, Chevy, and Plymouth accounted for 40.4 per cent of medium price car output. This segment of the market has shifted from almost 60 per cent in 1957 to about 45 per cent in the 1959 model production year.

• **Demand Shifts**—As Detroit prepares for 1960, it expects to see compact cars taking 25 per cent of the sales. Imports probably will hold close to their 10 per cent share. Station wagons will climb slightly. So will convertibles. If you count T-Bird in the luxury group (and we do), the top price car lines will slice out 6 per cent or more of 1960 sales. Right now, the industry is waiting to see what happens in steel negotiations. So are prospective buyers of 1960 cars.

Chromites May Cut Smog

Scientists at the Franklin Institute laboratories, Philadelphia, are adding chromite catalysts to the carbon monoxide present in auto exhausts to cut down on smog formation on the road.

Researchers use the chromites to reduce the amount of nitric oxide in the exhaust. They find that the reduction of nitric oxide sent into the air (down as much as 90 per cent in some cases) greatly lessens smog formation. The scientists are trying to determine whether the chromites will remain stable despite poisoning effects of lead and other elements found in the exhaust.

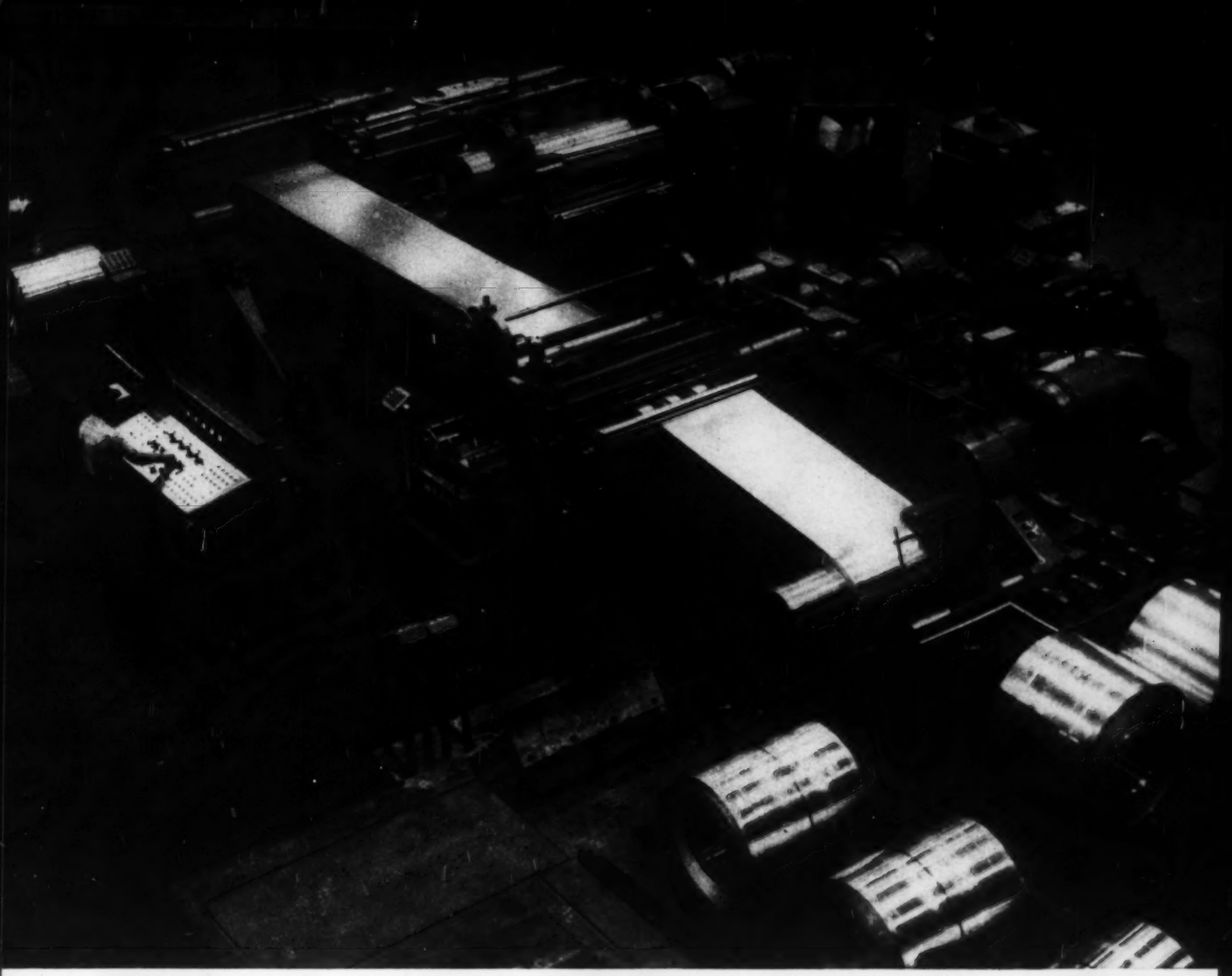
One big advantage of the chromites: They don't require additional equipment in a system to reduce smog.

U. S. Auto Output

Passenger Only	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,530	261,701
November	254,518	514,152
11 Mo. Totals	5,098,737	3,650,125
December	.....	593,920
Total	.....	4,244,045

Week Ended	1959	1958
Nov. 14	64,230	117,688
Nov. 21	68,476	138,727
Nov. 28	46,740	123,008
Dec. 5	55,337	147,361
Dec. 12	85,638†	137,882
Dec. 19	105,000*	135,964

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.



Anaconda Aluminum slits, side-trims, embosses sheet on one versatile Wean coil processing line

Unique versatility is the outstanding feature of this Wean light-gauge slitting and embossing line at Anaconda Aluminum Co.'s new fabricating plant at Terre Haute, Indiana. On this one compact line Anaconda Aluminum has the options of slitting and side-trimming, embossing, or side-trimming and embossing aluminum in widths to 60″. As shown in the photo, the embossing stand is withdrawn when not in use.

One of the special design features of this Wean coil processing line is a completely variable voltage system coupling all drive units. In combination with an electrical drag generator on the uncoiler, this control system gives uniform strip tension throughout all pre-set speed ranges. Line speeds vary up to 400 fpm on embossing and up to 1,000 fpm on slitting: gauges handled range from .008-.075″.

Anaconda Aluminum Co. has two other Wean coil processing lines in this same plant: heavy-gauge slitting and shearing, and a "Flying Press" blanking line.

Coil processing of non-ferrous and ferrous metals is Wean's specialty. No matter what operation you need to perform on coiled metals, Wean's experience can help you do it faster, better and more economically. We'd like to have a chance to prove that statement on your next coil processing application.

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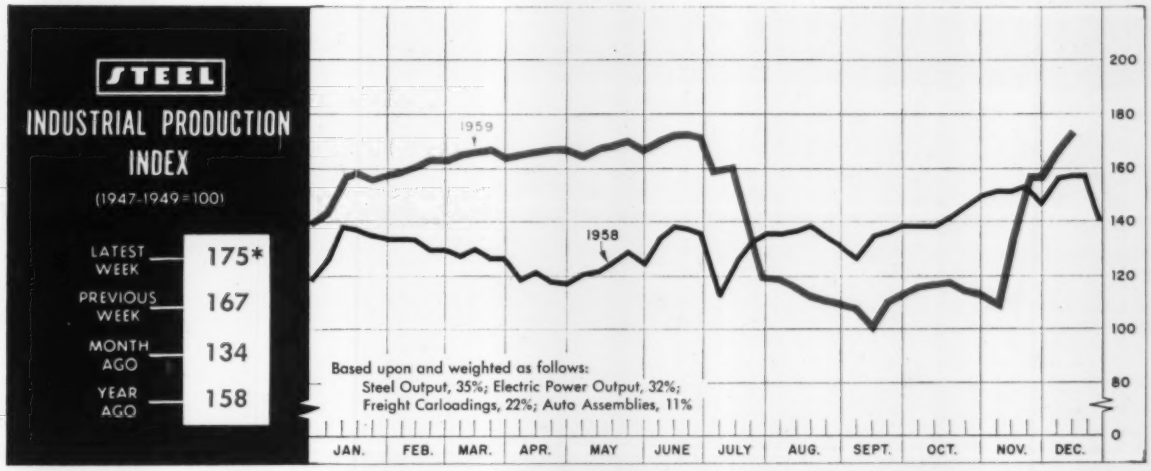

*Week ended Dec. 12

Steel Record Lifts Index to New Peak

TWO RECORDS in the latest period resulted in a third—a new high for STEEL's industrial production index (above). Paced by the steel and electric utility industries, the trend line rose to a preliminary 175 (1947-49=100) for the week ended Dec. 12, eclipsing the old mark by 1 point.

• **Steel Output Zooms** — The steel industry has already accomplished what few experts thought it would do much before the first quarter of 1960. It has established an all-time weekly production high of 2,732,000 net tons of ingots, and it has operated above 90 per cent of capacity for three consecutive weeks. When the workers re-entered the mills in early November, many steel market men would have made book on a top rate of 90 per cent and then doubled the bet that it wouldn't be for longer than one week.

The peak was set in the week ended Dec. 13, and STEEL estimates a matching performance for the period ended yesterday (Dec. 20). The new mark may well be topped in the near future. One area (Birmingham, see Page 120) is well behind that national average and could boost output momentarily. Furthermore, a national operating rate of close to 100 per cent is not impossible this late in the year because that rate is based on capacity as of last Jan. 1. Since then about 3 million tons have been added.

• **Generators Humming**—The second record setter is the electric power industry, which blasted its previous record in the week ended Dec. 12. Since the return of the steelworkers, electricity output has been advancing steadily with gains of 7 to 10 per cent above the 1958 levels. On that basis, production in the latest week was about 14.4 billion kw-hr, well above the previous peak of 14.1 billion set during August's heat wave. If the trend holds—and there is no reason it

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,732[1]	2,732	2,011
Electric Power Distributed (million kw-hr)	14,400[1]	13,907	13,450
Bituminous Coal Output (1,000 tons)	9,055[1]	8,050	9,160
Crude Oil Production (daily avg—1,000 bbl)	7,000[1]	7,026	7,097
Construction Volume (*ENR*—millions)	$293.7	$383.4	$353.3
Auto, Truck Output, U. S., Canada (*Ward's*)	97,538[1]	66,718	160,724
TRADE			
Freight Carloadings (1,000 Cars)	650[1]	650	588
Business Failures (Dun & Bradstreet)	261	268	294
Currency in Circulation (millions)[3]	$32,601	$32,444	$32,218
Dept. Store Sales (changes from year ago)[3]	+2%	+3%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,749	$23,955	$21,689
Federal Gross Debt (billions)	$292.4	$290.6	$282.9
Bond Volume, NYSE (millions)	$36.2	$37.4	$32.4
Stocks Sales, NYSE (thousands of shares)	17,001	18,033	19,095
Loans and Investments (billions)[4]	$105.7	$104.2	$94.9
U. S. Govt. Obligations Held (billions)[4]	$28.2	$27.2	$32.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	231.2	231.2	217.3
All Commodities[7]	119.0	118.9	119.0
Commodities Other than Farm & Foods[7]	128.6	128.6	127.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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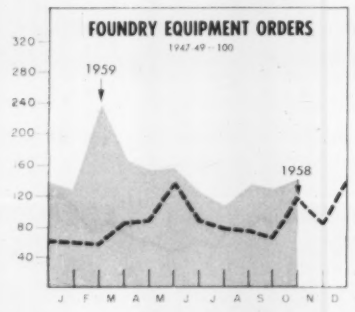
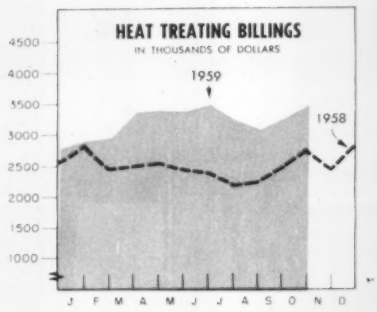
THE BUSINESS TREND





	1959	1958	1957
Jan.	127.4	57.9	117.9
Feb.	237.1	57.6	188.4
Mar.	166.6	85.9	127.0
Apr.	154.2	88.7	101.1
May	157.0	136.1	136.2
June	125.1	87.7	187.5
July	110.7	77.9	98.6
Aug.	134.1	74.1	231.3
Sept.	131.3	64.5	113.9
Oct.	140.8	118.9	145.3
Nov.	....	83.3	59.6
Dec.	....	137.0	61.4
Avg	....	89.1	130.7

Foundry Equipment Mfrs. Assn.
Charts copyright, 1959, STEEL.

	1959	1958	1957
Jan.	2,915.5	2,825.5	3,533.9
Feb.	2,976.0	2,466.3	3,378.9
Mar.	3,397.3	2,490.5	3,631.8
Apr.	3,420.6	2,538.0	3,572.4
May	3,405.6	2,421.5	3,389.6
June	3,518.5	2,367.3	2,912.1
July	3,259.7	2,141.5	2,767.5
Aug.	3,111.3	2,212.9	2,830.8
Sept.	3,285.7	2,456.9	2,765.0
Oct.	3,509.8	2,754.3	3,076.2
Nov.	....	2,422.0	2,677.2
Dec.	....	2,799.4	2,579.3

Metal Treating Institute.

shouldn't—this segment of our index will loom even larger by the Christmas week because of increased residential and commercial consumption.

• **Chances for Gains**—While most of the increase in the index resulted from the above two factors, it should be noted that the auto industry began its comeback in the latest week and contributed an important 3 point gain to the total. By now practically all auto assembly plants have been reactivated, and production was expected to climb above the 100,000 unit a week mark last week for the first time since late October.

In a week otherwise marked by impressive performances, only railroad freight carloadings remained stable. But this is worth noting because carloadings normally decline at this time of year. The rush to fill steel pipelines, the extension of the Great Lakes ore season, and the re-awakening of metal-starved industries account for the counter-seasonal pattern.

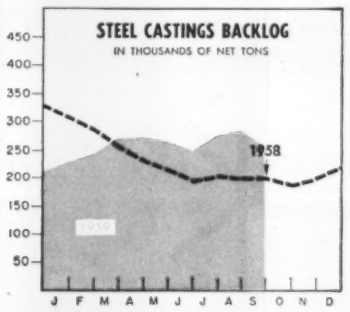
• **Outlook**—Only a complete reversal of form can prevent the index from rising again for the week just ended. Look for a sharp increase in the Federal Reserve Board's industrial production index for December. It should regain at least half of the ground lost since the top level of 155 (1947-49 = 100) was set last June. It rose 1 point to 148 in November.

Chicagoans Look Ahead

With 1959 closing on such a strong note, it's hard to keep the optimists in check on the forecasts for 1960. Even the perennial pessimists are climbing aboard the overcrowded 1960 boom wagon.

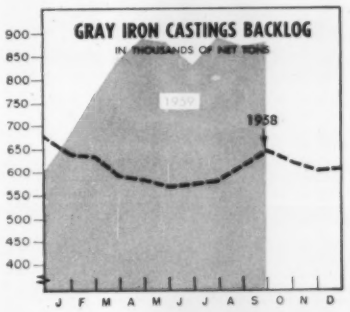
While gains may not be as large next year as they were this year following the recession, the over-all state of the economy will be good in the opinion of top industry executives who formed the outlook panel for the First National Bank of Chicago. Here is what they see for some important industries:

Utilities — Telephone companies will install about 4 million phones, a little ahead of the 1959 pace. Plant modernization and service improvements will cost $2.6 billion. Electricity output will be up 7 per cent, and installed capacity will rise by 12 million kw. About $3.4 million will be laid out for construction of new facilities. Gas utilities



	Shipments 1959	Shipments 1958	Unfilled Orders* 1959	Unfilled Orders* 1958
Jan.	105.4	120.7	232.6	304.9
Feb.	110.3	103.3	245.1	282.4
Mar.	131.3	106.2	270.7	252.8
Apr.	134.3	91.5	271.6	229.5
May	135.4	87.0	264.0	211.3
June	143.6	92.9	248.8	190.8
July	106.8	68.8	274.1	200.3
Aug.	98.0	80.9	279.3	196.3
Sept.	99.7	85.3	256.9	196.5
Oct.	....	95.4	....	184.9
Nov.	....	85.3	....	194.0
Dec.	....	103.8	....	214.4
Total	....	1,121.1		

*For sale. U. S. Bureau of the Census.



	Shipments 1959	Shipments 1958	Unfilled Orders* 1959	Unfilled Orders* 1958*
Jan.	1,002	868	687	638
Feb.	1,037	753	767	632
Mar.	1,206	796	847	590
Apr.	1,246	807	892	582
May	1,236	820	885	570
June	1,252	868	837	573
July	943	792	898	580
Aug.	744	802	873	614
Sept.	850	917	883	645
Oct.	....	993	...	620
Nov.	....	958	...	602
Dec.	....	998	...	608
Total	....	10,372		

*For sale. U. S. Bureau of the Census.

will equal 1959's construction outlays of $1.9 billion.

Steel—First half production will be at least 70 million tons—a record. Production for the year will be at 87 per cent of the new capacity of about 150 million tons. That will equal close to 130 million tons.

Construction — During the first half, there will be a 6.6 per cent decline from the year-ago level. The breakdown:

Residential—off 20 per cent.
Commercial—up 5 per cent.
Industrial—up 20 per cent.
Institutional—unchanged.

Repairs, maintenance—up 6 per cent.

Public—down 5 per cent.

Aircraft, Missiles—A gentle falloff will come in fiscal 1960. While aircraft will decline about $1 billion, missiles will climb $600 million to $700 million. Electronics will rise about $100 million. Orders for commercial turbojet and turboprop planes have almost reached 1000 units, and "there is evidence that a cycle of new orders is in the making and should gather momentum in 1960."

Retailing—Durable goods should be up 8 to 10 per cent, while nondurables should rise about 5 per cent. Over-all, the increase will be 7 to 8 per cent in retail sales.

Construction Machinery — Demand will increase slightly in 1960, with greater strength in the foreign market than in the domestic.

Autos — Earlier estimates of 7 million unit sales are getting "a careful second look, and generally speaking, they are being revised upward."

Railroads—Freight carloadings in the first half of 1960 will be up 5 to 7 per cent over year-ago levels.

Others Speak Up

Herman F. Lehman, vice president of General Motors Corp. and general manager of Frigidaire Div., sees appliance sales edging slightly above the 1959 level and topping those in 1958 by 15 per cent. The American Home Laundry Manufacturers' Association forecasts a sales increase of 4 per cent for its products in 1960 over 1959.

Aluminum shipments next year will top the 1959 total of 2.4 million tons by about 10 or 15 per cent, says the Aluminum Co. of America.

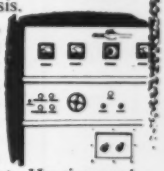
The rail industry may place as many as 60,000 car orders next year, says Joseph B. Lanterman, president of American Steel Foundries. This would be the best mark since 1955.

MARIAN A. STACHOWIAK,
Hayes Induction Heating Engineer, reports . . .

SELECTIVE HEAT TREATING CAN BE SIMPLE . . .

when equipment and application know-how go to work

High-Frequency Induction Heating . . . standard procedure for selective hardening, melting, annealing, brazing, preheating, hot forming, sintering, and vacuum heating . . . now takes a big step forward with another Hayes development — a new high-frequency induction unit that puts selective heating on a *simple* and *economical* basis.



PUSH-BUTTON Controls are featured with this new Hayes induction heater to obtain instant and exact heat distribution at any desired surface area of a steel part. Heating and quenching cycles are *automatically controlled* and are so rapid that distortion, decarburization, and excessive oxidation are practically eliminated. Protective atmosphere systems (pioneered by Hayes) can be supplied as an integral part of the induction unit.

UNIT Design Saves Space — because heater stations and power generator are incorporated in *one* compact cubicle . . . for more output per sq. ft. of floor space. Moreover, the Hayes unit includes work handling devices which can be set up simply, integrated into your production line, and operated as easily as any other machine tool.

Safe, Easy Maintenance is another feature of Hayes' design. Easy-access panels provide plenty of working room for maintenance and adjustment of components. Safety interlock switches throughout shut off plate power when panels are opened. Write for information on Hayes new induction heating unit, work tables and accessories . . . or other "Results Guaranteed" furnaces in Hayes Certain Curtain line.

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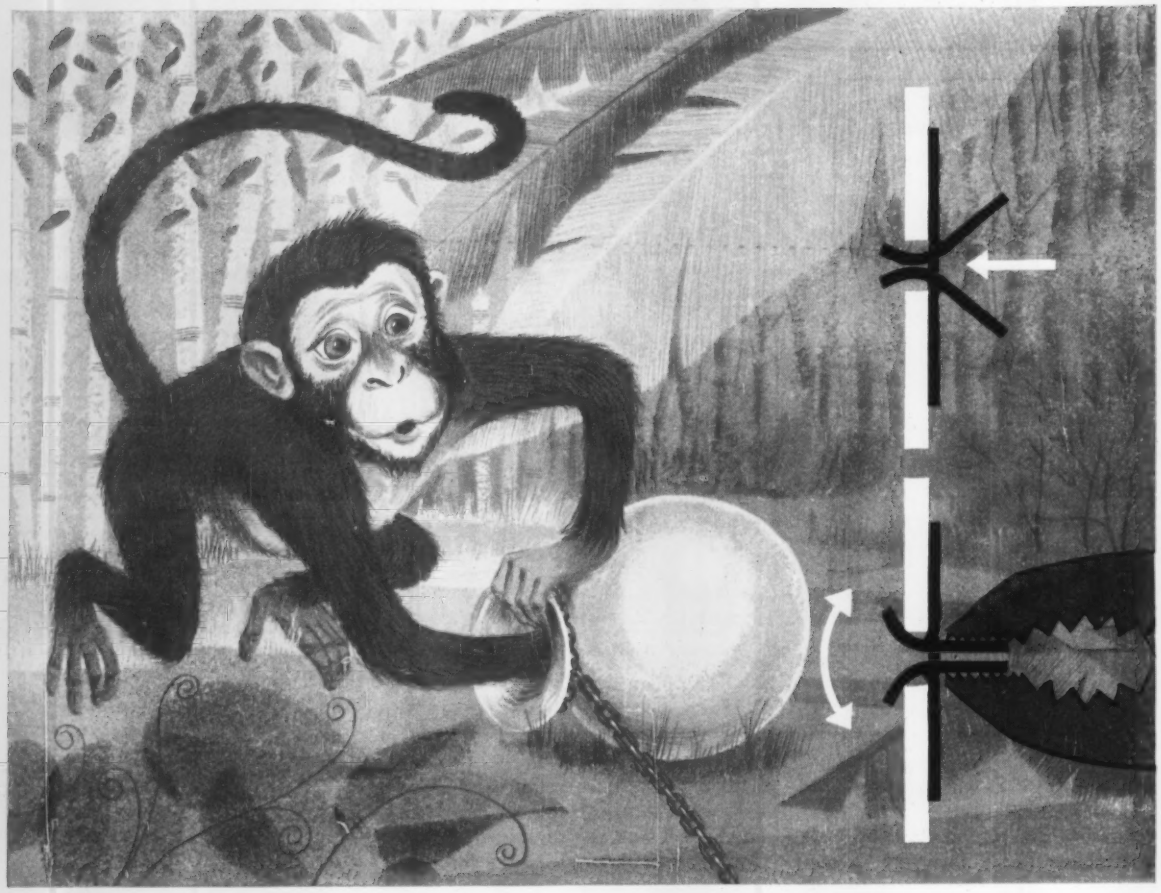

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See how Tinnerman "pinch-grips" hold front-mounting attachments; no special equipment needed

Typical of Tinnerman *new approaches to old problems* are "pinch-grip" SPEED CLIPS—permitting front-of-panel applications in a second's time. SPEED CLIPS are simply inserted into mounting holes and a plier's pinch gives permanent retention.

SPEED CLIPS can increase production rates, eliminate rejects, cut assembly costs as much as 50%. Many different features may be incorporated in the SPEED CLIP design to fasten cables, wire harness, rubber feet, mouldings, and for scores of other assemblies.

You may have a fastening problem that can be solved—or a product which can be improved—by this SPEED CLIP principle. Your Tinnerman specialist (see the Yellow Pages) can furnish samples and help you in many ways. Or write:

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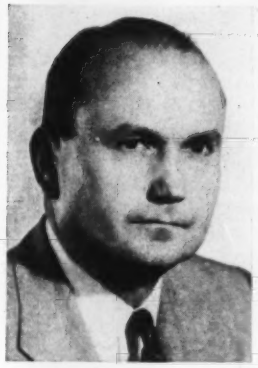


C. LEE EMERSON
Kaiser Steel v. p.-sales

LOUIS L. MELICK
Dana exec. v. p.-sec'y

ALFRED G. BOSANKO
I-T-E vice president

LUTHER W. CASHDOLLAR
Union Electric Steel v. p.

C. Lee Emerson was elected vice president-sales, **Kaiser Steel Corp.**, Oakland, Calif. He was general sales manager.

Louis L. Melick was elected executive vice president and secretary, **Dana Corp.**, Toledo, Ohio. He was vice president-finance and secretary. **L. L. Dodge** was elected vice president-finance and assistant secretary.

Robert C. Jacobs was promoted from production manager to assistant general manager, Automotive Gear Div., Richmond, Ind., **Eaton Mfg. Co. Cyril J. Mann**, former production control manager for jet blades in Battle Creek, Mich., was named to a similar position with the Automotive Gear Div.

C. F. Anderson was named president of **Camrose Tubes Ltd.**, Camrose, Alta., which is constructing a large diameter steel pipe mill. It is a joint venture of Page-Hersey Tubes Ltd. and Steel Co. of Canada Ltd. Mr. Anderson is executive vice president and general manager, Page-Hersey Tubes. **L. T. Craig**, Stelco vice president, was made vice president of the Camrose firm.

George Gerza was made manager of **Crane Co.'s** Pipe Fabrication Div., Chicago.

Henry E. Netter was appointed works manager of **Rolled Steel Corp.**, Skokie, Ill. He will supervise facilities in both Skokie and Houston. He was manager of the Order Programing Dept.

Alfred G. Bosanko was elected to the new post of vice president-indoor distribution, **I-T-E Circuit Breaker Co.**, Philadelphia. He was president, Walker Electrical Co. He moves to I-T-E's Philadelphia headquarters about the first of the year. He has served as a director of I-T-E since February, 1957.

Milo F. McCammon, former assistant general manager, was named general manager, **Eclipse-Pioneer Div.**, Teterboro, N. J., **Bendix Aviation Corp.** He succeeds **Roy H. Isaacs**, recently made vice president-government relations for the corporation. **James E. Bevins**, director of engineering, was named assistant general manager.

Victor J. Grubenhoff was made assistant manager-industrial engineering for **Jack & Heintz Inc.**, Cleveland. He was supervisor of industrial methods engineering at Lima, Ohio, for Westinghouse Electric Corp.

W. Clair Shaffer was elected president, **Michigan Forging Co.**, Dearborn, Mich., to succeed **Edgar R. Siebert**, named chairman.

Edward J. Green was elected vice president-planning and marketing, **Westinghouse Air Brake Co.**, Pittsburgh.

Anthony von Wening was elected chairman of **Cherry-Burrell Corp.**, Cedar Rapids, Iowa, to succeed **Howard H. Cherry Sr.**, named honorary chairman. Mr. Von Wening is also chairman and president of Basic Products Inc., Milwaukee.

Luther W. Cashdollar was elected vice president-sales, **Union Electric Steel Corp.**, Pittsburgh. He rejoins the company which he left in 1953. He had previously served as chief metallurgist.

Portus M. Wheeler was made vice president-sales, Indiana Steel Products Div., **Indiana General Corp.**, Valparaiso, Ind. **Frank A. Saikley** was made assistant treasurer and assistant secretary of the company.

Dr. Charles E. Reed was made general manager, Chemical & Metallurgical Div., Bridgeport, Conn., **General Electric Co.**, succeeding Vice President **Robert L. Gibson** who was named general manager of the Transformer Div. in Pittsfield, Mass. Dr. Reed was general manager of the Metallurgical Products Dept. in Detroit.

Elmer Brandt was appointed manufacturing vice president, **Hevi-Duty Electric Co.**, Milwaukee. He was manager of the Watertown, Wis., plant, and is succeeded by **John Steinman. Elton E. Staples**, vice president, was put in charge of operations concerning industrial and laboratory heating equipment. **Arthur Frank** was named vice president-sales; **Albert Bassett** chief engineer, Industrial Furnace Div.

Harry F. Davis, manager of the Equipment Sales Div., Detroit, was promoted to general sales manager of **Champion Spark Plug Co.**, Toledo, Ohio.

L. C. Johnston was made chief metallurgist for the Sydney Works of

JAMES P. SULLIVAN

WALTER N. MARBLE

asst. superintendents at Republic's Gadsden plant

ALBERT A. E. BOCK

PAUL J. WISNIEWSKI

promotions for Wyman-Gordon's Prex plant

Dominion Steel & Coal Corp. Ltd., Sydney, N. S.

James P. Sullivan was appointed assistant superintendent, Open Hearth & Electric Furnace Dept., at the Gadsden, Ala., plant of **Republic Steel Corp.** He transfers from Chicago where he was assistant to the melt shop superintendent. **Walter N. Marble** was made assistant superintendent, Cold Strip Dept., at Gadsden. He was with Jones & Laughlin Steel Corp.

Edward R. Corvey, former general manager, Alexandria, Va., Div., **American Machine & Foundry Co.**, New York, was appointed deputy director of planning for the company.

Burton H. Berman fills the new post of executive assistant of **Avnet Corp.** He will be responsible for the Los Angeles operation as well as act in a liaison capacity between Avnet Corp. and Avnet Electronics Corp. and its subsidiaries.

Joseph F. Griffin was made manager, Seminole Div., Ft. Lauderdale, Fla., **Airpax Electronics Inc.** His duties encompass supervision of plant operation including engineering, production, and product planning. He joined Airpax last March as special sales representative to the Missile Center at Cape Canaveral, Fla. He was president of Avionics Corp. of America, an organization he founded in 1947.

Dr. Nisson A. Finkelstein was appointed assistant vice president and director of research, **Stromberg-Carlson Div.**, Rochester, N. Y., General Dynamics Corp. He succeeds **Lynn C. Holmes**, named director of engineering operations. Dr. Flinkelstein was assistant director of the Scientific Bureau of Bausch & Lomb Optical Co.

Promotions in the research and engineering staff of **Eaton Mfg. Co.'s** Central Research Div., Cleveland, include: **George R. Pipes**, former chief engineer, advanced to assistant manager of the division; **Harold A. Frost**, chief electrical engineer, named manager-product development; and **Joseph E. Urbassik** promoted to automation manager.

H. H. Adams, vice president, was appointed manager of the Power Cylinder Div., **Hannifin Co.**, a division of **Parker-Hannifin Corp., Des Plaines, Ill. Z. J. Lansky** was made manager, Valve & Crown Div.; **M. E. Lawrence** manager, Machinery Div. Mr. Adams was vice president-manufacturing. Mr. Lansky was chief engineer, Power Cylinder Div. Mr. Lawrence joined Hannifin in 1958 with 20 years' experience in hydraulic press design.

Albert A. E. Bock was appointed manager of the **Prex plant of Wyman-Gordon Co.** at Franklin Park, Ill. **Paul J. Wisniewski** was made sales manager.

Electric Autolite Co., Toledo, Ohio, named **Joseph A. Cappi** (vice president) to head its service parts operations. He co-ordinates engineering and procurement for the division.

Charles R. Roberts was elected executive vice president, **Macomber Inc.**, Canton, Ohio, and subsidiaries. He was in charge of the Rock Island Steel Div.

William H. Wehmhoff was made sales manager, **Manufacturers & Fabricators Inc.**, Elyria, Ohio.

James L. Frankel was elected president and treasurer, **Buffalo Steel Corp.**, Buffalo. **August E. Klinger** was elected chairman.

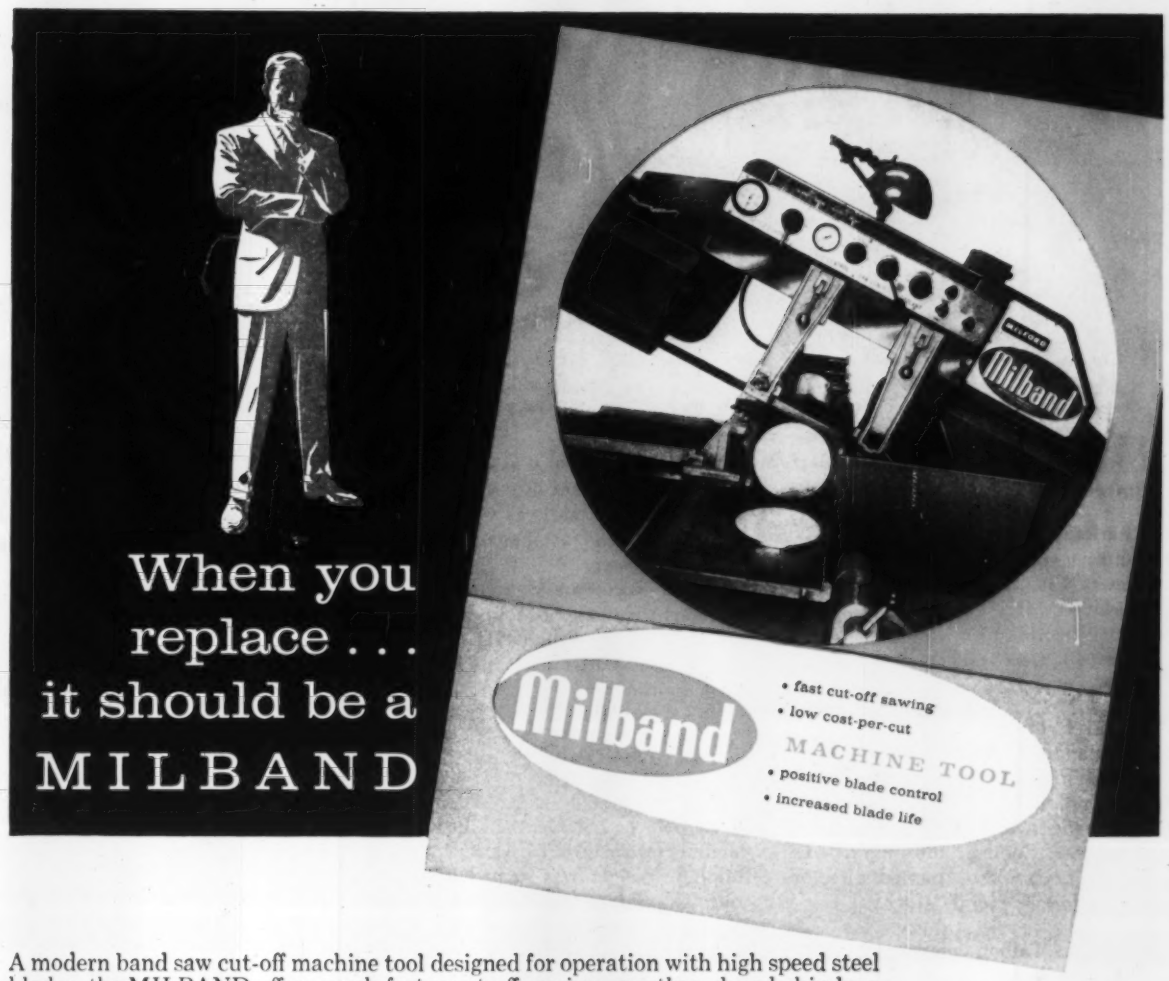
Ferris P. Beardsley was made marketing manager, **Alco Products Inc.**,

H. H. ADAMS

Z. J. LANSKY

M. E. LAWRENCE

division product managers for Hannifin Co.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• low cost-per-cut
MACHINE TOOL
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• increased blade life

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CHARLES J. GEISER *Republic Flow Meters post*

WILIAM F. PURVES *Electric Autolite div. mgr.*

JOHN GLAWSON *Dixie Tube gen. mgr.*

Latrobe, Pa. He succeeds **R. H. Binkerd.**

Charles J. Geiser was named chief contract engineer at **Republic Flow Meters Co.**, Chicago, subsidiary of Rockwell Mfg. Co. He has been with Republic for 22 years as a sales engineer and contract engineer.

David A. Hill was named manager, Semiconductor Div., Hughes Products Group, **Hughes Aircraft Co.**, Culver City, Calif. **Lloyd H. Scott** was made manager of Santa Barbara Research Center, subsidiary. **L. James Levisee** was named director of materiel-general office.

John S. Talbot, manager of the Houston district office, was named to head the service section of Dow Industrial Service, new division in Cleveland of **Dow Chemical Co.**

Rudolph A. Rieder was named operations manager in Gardena, Calif., for Data Systems Dept., **Norden Div.**, United Aircraft Corp.

William B. Ross succeeds **Joseph H. Treanor,** retired, as president of **New England Coke Co.** and **Mystic Iron Works,** Boston.

Melvin A. Reed was appointed industrial relations director for **Clinton Engines Corp.**, Clinton, Mich.

Kenneth E. Joy fills the new post of vice president-sales, **Judson L. Thomson Mfg. Co.**, Waltham, Mass. He was general sales manager.

Stanley T. Bowden was made sales manager, **Watson-Stillman Press Div.**, Rochester, N. Y., Farrel-Birmingham Co. Inc.

William F. Purves was named manager of **Electric Autolite Co.'s** Bay City, Mich., Div. He was vice president-engineering at Fasco Industries, Rochester, N. Y. **Jack B. Schneider** was named manager of manufacturing methods and facilities at Bay City; **Michael J. Montferrante** superintendent of instrument manufacturing.

John Glawson was made general manager, **Dixie Tube & Steel Corp.**, Dothan, Ala.

In the Marketing Dept. of **Federal Pacific Electric Co.**, Newark, N. J., **Ralph J. Weiger** was named industrial sales manager; **Armond J. Bisignani Jr.** marketing manager, General Products Dept.; **Walter H. Niemann** marketing manager-laboratory switchboards.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., named **J. P. Dunston** assistant product sales manager for sheets and plates. **Charles W. Unbehaun** was made engineering manager - automotive sales. **David H. Mogill** was made Atlanta district sales manager. Named to the overseas operations staff: **Willard D. Sharpe**, area operations manager for Continental Europe; **Glenn E. Weekley** area operations manager, Latin America; **William R. Smith** manager of operations and investments in India.

J. L. Humphrey, former manager-industrial fastener sales for **Bethlehem Steel Co.'s** Pacific Coast Div., was made sales manager in the Seattle district office.

Richard C. Kasser was named manager of design and sales engineering for **Aluminum Co. of America's** new Aluminum Structural Div., Pittsburgh. **William T. Ennor** retires as assistant director of research for the company. **Thomas J. Lannen** was made manager-residential sales to succeed **W. S. Ellis Jr.,** named advertising promotion manager.

Fred D. Crowther was elected vice president-general manager, **Chapman Valve Mfg. Co.**, Springfield, Mass., subsidiary of Crane Co. He was with General Electric Co.

George T. Bowman was named manager of roll sales at **Hyde Park Foundry & Machine Co.**, Hyde Park, Pa.

Brig. Gen. George A. Roll, formerly a staff member of the Net Evaluation Subcommittee of the National Security Council, was made manager of special projects in **American Machine & Foundry Co.'s** Management Services Div., New York.

J. Patrick Munsch was appointed Sharon, Pa., district manager, Products Div., **United States Steel Corp.** He succeeds **James A. Connelly,** a former vice president of the division, now retired.

Hamilton W. Watt was made eastern regional sales manager, **Bohn Aluminum & Brass Corp.**, Detroit.

William W. Marshall was named eastern regional district sales manager, **John Cadigan** east-central regional district sales manager for **Delta Power Tool Div.**, Rockwell Mfg. Co., Pittsburgh.

Louis J. Limone was made district sales supervisor, New York, New Jersey, and Philadelphia, for **S. W. Card Div.**, Union Twist Drill Co.

OBITUARIES...

William J. Ross, 70, retired vice president, **Hyman - Michaels Co.**, Chicago, died Dec. 9.

Harold M. Shonberg, 49, president, **Alpha Metals Inc.**, Jersey City, N. J., and Alpha-loy Corp., Chicago, was killed in a plane crash Dec. 5.

Ludwig C. Boos, 56, vice president, **United States Rubber Co.**, New York, and general manager of its International Div., died Dec. 7.

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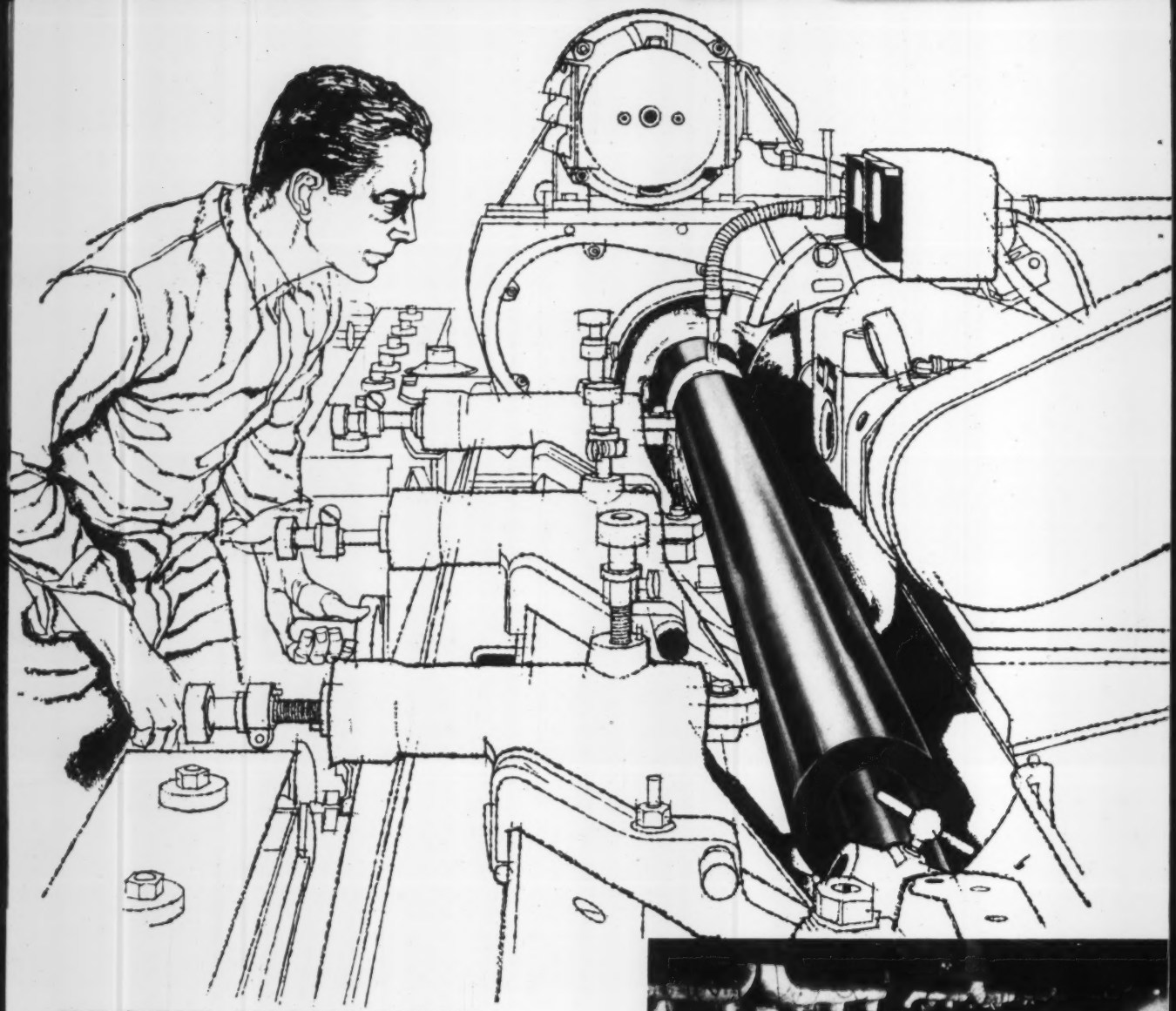

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Bliss Incorporates Many New Features in Presses

LARGE PRESSES being built by E. W. Bliss Co., Canton, Ohio, incorporate many new features which company officials believe will become standard. They will tend to make existing presses obsolete, Bliss declares.

A $5 million order for 41 of the presses has been placed by an automotive firm, reportedly Fisher Body Div., General Motors Corp. (STEEL Dec. 7, p. 111). The order includes 21 large straight side rolling bolster presses, 18 cloverleaf welding presses, and two blanking presses. The units will be delivered in time for production of 1961 model cars.

The 21 straight side underdrive presses will make up three complete stamping lines. Each of the lines consists of a double action draw press, a single action spanking press, and five secondary operation presses. Capacities for individual presses in the lines are about 800 tons.

• **New Features**—The presses incorporate such innovations as rolling bolsters, two speed clutch on the double action units, automatic ram positioners, automatic die clamps, hydraulic overload protection, and low inertia eccentric drive.

Each press in the three lines will be equipped with the new rolling bolster. With this new arrangement, the entire line can be converted to a different set of dies in a matter of minutes, eliminating hours of lost production time required for changing dies in large presses of conventional design.

The two speed clutch design of the double action presses provides for slow draw and quick return or for continuous operation at either of two speeds. The arrangement allows for a new concept in inching during die tryout. Previously, automotive stampers have customarily been inching at only one and one-half strokes per minute, using a special inching drive provided for the purpose. Bliss's two speed clutch arrangement enables the user to inch at eight strokes per minute.

In the automatic die clamping device, threaded T-bolts clamp or unclamp the dies in seconds. The device is driven by a pushbutton controlled torque motor and has electric interlocks which protect both dies and press against damage.

The automatic ram positioner is electronically controlled. The operator sets the dials and pushes a button to position the ram to any desired shut height within 0.002 in.

Hydraulic overload protection is provided in a unique system in which any overload releases oil under pressure equal to a preset capacity. This in turn stops the press and causes warning lights to flash.

A simplified gear train in the single action presses has only four gears. The result is an extremely low inertia load, with a high tripping rate and minimum clutch wear.

Foundry Status Changed

Chrysler Corp., Detroit, is changing the legal status of its subsidiary, American Foundry Co. Inc., to that of an operating facility of its Forge & Foundry Div. Earl Guckelberg will continue as manager of the American Foundry plants in Indianapolis when the change becomes effective Dec. 31.

Crucible Adds Two Lines

Crucible Steel Co. of America, Pittsburgh, has placed in service two stainless annealing and pickling lines at its Midland (Pa.) Works. The lines were designed and built by Aetna Standard Engineering Co., Ellwood City, Pa. They're powered by Allis-Chalmers motors and controls.

The hot rolled strip annealing and pickling line consists of a processor uncoiler, a buttwelder, loop pit, pickling tanks, mechanical scale removal, annealing furnace, upcut shear, and rewind facilities. Maximum line speed is 100 fpm. The entry section provides for 300 fpm to allow for loop storage.

The cold rolled continuous annealing and pickling line is arranged for either one or two strip operation. In the processing section, maximum speed is 150 fpm. Loop recovery requires maximum speeds of 225 fpm.

Foundry Changes Hands

Capital stock of Homer Foundry Corp., Coldwater, Mich., has been purchased by Jack Bean, president; Harold Schroeder, vice president; and P. G. Smith, secretary-treasurer. The three also own and operate Bay City Foundry Co., Bay City, Mich. Frank Cooke is works manager at Coldwater.

Dow Forms Sales Group

Dow Metal Products Co., a division of Dow Chemical Co., Midland, Mich., formed an aluminum mill product sales group headed by H. E. Swayze. Dow is devoting more of the capacity of its 13,200 ton extrusion press and smaller extrusion presses to aluminum.

Machine Tool Firm Builds

A plant addition will more than double the machine assembly area and add more than 25 per cent fabricating space at F. Jos. Lamb Co., Detroit, machine tool builder.

Boosts Strapping Output

Canadian Steel Strapping Co., Toronto, Ont., has awarded a contract for construction of a plant, warehouse, and office building on Ridge Top Road, Scarborough, Ont. New equipment will double the firm's Canadian output of steel strapping.

Budd Expanding at Gary

Budd Co., Philadelphia, has launched the second phase of a $5.5 million program, covering the expansion of press, assembly, and shipping areas at its auto body plant in Gary, Ind. The project has been undertaken to keep pace with American Motors Corp.'s expansion plans which call for installation of a third assembly line at its plant in Kenosha, Wis. The assembly line is in addition to $17.5 million and $14.5 million expansion programs announced by American

Motors earlier this fall. Budd's production at Gary is devoted entirely to automotive body parts and subassemblies for American Motors.

CONSOLIDATIONS

Yuba Consolidated Industries Inc., San Francisco, is acquiring the assets of **Bedford Foundry & Machine Co. Inc.**, Bedford, Ind.

Olin Mathieson Chemical Corp., New York, acquired full ownership of **Almetco Inc.**, Nesquehoning, Pa., by purchasing the one-half interest formerly held by Textron Inc. Almetco operates an aluminum extrusion plant. H. E. Gude, vice president for manufacturing of Olin Mathieson's Metals Div., will continue as president of Almetco. V. W. Archer is plant manager.

Shaw Instrument Corp. and **Ceramic-Metal Assemblies Corp.**, Latrobe, Pa., have merged. Ceramic-Metal makes metallized ceramics and high temperature, vacuumtight seals. Shaw makes temperature measurement and control equipment and specialty electronic and nuclear instruments. Officers of the consolidated firm, Shaw Instrument Corp., are: Chairman, S. H. Stupakoff; president, V. G. Shaw; executive vice president and treasurer, R. R. Sloan Jr.; vice president and secretary, B. F. Bonaker; and vice president-engineering, J. F. Murray. John A. Ammerman is sales manager.

Sel-Rex Corp., Nutley, N. J., purchased **Meaker Co.**, Chicago, manufacturer of automatic systems for continuous and batch metal processing or finishing. Executive personnel of the new subsidiary are: President, M. M. Messing; executive vice president and general manager, Victor Finston; administrative vice president, Alexander Wright; secretary-treasurer, L. R. Collart; assistant general manager, J. L. Ross.

Vought Industries Inc., a newly formed subsidiary of Chance Vought Aircraft Inc., Dallas, acquired two mobile home manufacturers: **General Coach Works**, Marlette, Mich., and **ABC Coach Co.**, Clarion, Pa. The firm has signed a purchase agreement with **Mid-States Corp.**, Battle Creek, Mich. Clifford E. Burt is president of Vought Industries.

Robinson Technical Products Inc., Teterboro, N. J., and **Kensico Tube Co. Inc.**, Mt. Kisco, N. Y., will merge, subject to approval of stockholders. Kensico would become a division of Robinson and would continue to make copper tubing from diameters of 2 in. down to tiny capillary sizes. Robinson makes metal shock absorbing equipment.

Acoustica Associates Inc., Mineola, N. Y., purchased **Ender-Monarch Corp.**, Garfield, N. J., manufacturer of illumination equipment. Acoustica makes ultrasonic cleaning and gaging systems.

ASSOCIATIONS

American Institute of Steel Construction Inc., New York, re-elected these officers: President, H. B. Dietrich, Dietrich Bros. Inc., Baltimore; first vice president, J. M. Straub, Ft. Pitt Bridge Works, Pittsburgh; second vice president, H. G. Lewis, Flint Steel Corp., Tulsa, Okla.; secretary, M. H. Smedley, New York; and treasurer, E. P. Stupp, Stupp Bros. Bridge & Iron Co., St. Louis. L. Abbett Post was re-elected executive vice president.

National Federation of Independent Scrap Yard Dealers Inc., New York, elected these officers: President, Lester Shapiro, Henry Shapiro & Co., Wilkes-Barre, Pa.; first vice president, Arthur Chiappari, Bronx Iron & Metal Corp., Bronx, N. Y.; second vice president, Nate Willis, Eastern Iron & Metal Co., Detroit; secretary, Sarah Rapport, Joe Rapport & Co. Inc., New Philadelphia, Ohio; and treasurer, Sidney Rockmuller, Independent Scrap Iron & Metal Corp., Brooklyn, N. Y. S. J. Asrael, Alexandria Junk Co., Alexandria, Va., was re-elected chairman of the board.

Cast Iron Soil Pipe Institute, Chicago, elected these officers: President, C. A. Hamilton, Alabama Pipe Co., Anniston, Ala.; executive vice president, H. E. Robertson; and vice president, J. J. Flynn, Central Foundry Co., Holt, Ala.

NEW OFFICES

Riverside-Alloy Metal Div., H. K. Porter Company Inc., Riverside, N. J., established a branch office at 3900 E. Outer Drive, Detroit, Mich. Joseph Rey is in charge of the office.

Republic Steel Corp., Cleveland, will establish a district sales office in Milwaukee on Jan. 1. The area, formerly a part of the Chicago sales district, will be under the direct supervision of C. L. Macy as district manager, says L. S. Hamaker, assistant vice president in charge of sales.

Fairbanks, Morse & Co., Chicago, established a Pacific Coast sales region with headquarters in San Francisco. R. M. Murray has been appointed vice president in charge of the region.

Fostoria Corp., Huntingdon Valley, Pa., opened a sales office for its Chempump and Dynapump Divisions at 1629 Eastern Parkway, Schenectady, N. Y. The office is under the direction of Lee Heath.

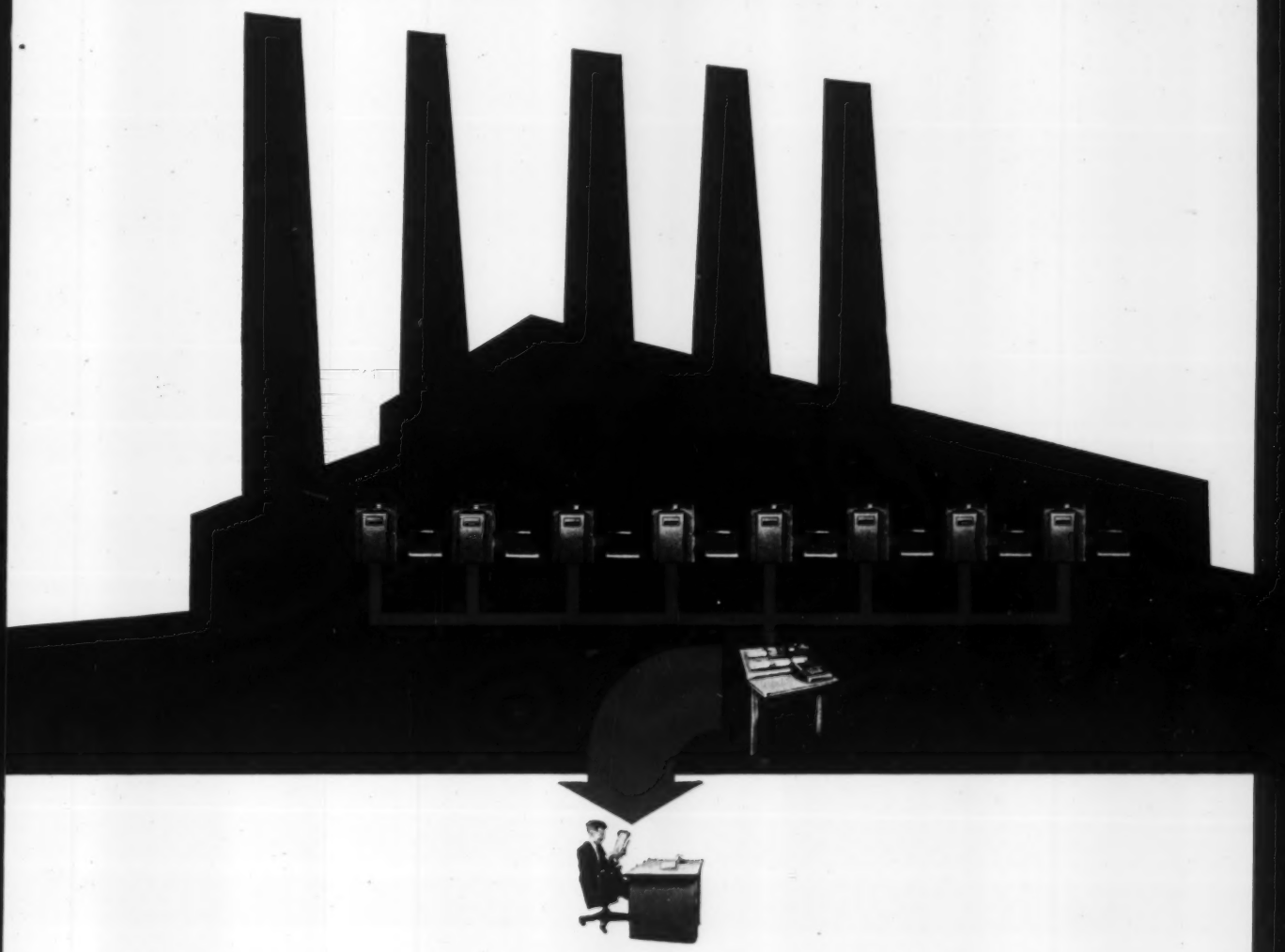
Buckeye Tools Corp., Dayton, Ohio, established a branch office at 17311 W. Seven Mile Rd., Detroit, Mich. Hugh H. Harris is in charge of the office, assisted by J. K. Wilson, area sales engineer. Buckeye's products include drilling, abrasive, fastening, and special air tools.

NEW ADDRESSES

Advance Floor Machine Co. moved to Spring Park, Minn.

WaiMet Alloys Co. moved its headquarters and manufacturing facilities to 5320 Oakman Blvd., Dearborn, Mich. The company produces stainless steels, tool steels, and superalloys. Production will be started on high alloy forging billets. The new building will house a complete metallurgical and testing laboratory for production testing and development work.

do you get production reports in time for a decision...or a post mortem?



IBM 357 Data Collection System speeds "live" production data to management in time for action

Production line data must be "live" if it's to be of use in management decisions. The new IBM 357 Data Collection System now makes this information available as soon as it occurs . . . in readily usable punched card form. The IBM 357 greatly increases the volume and speed of data flowing from production line to management, yet drastically reduces the amount of paper work involved.

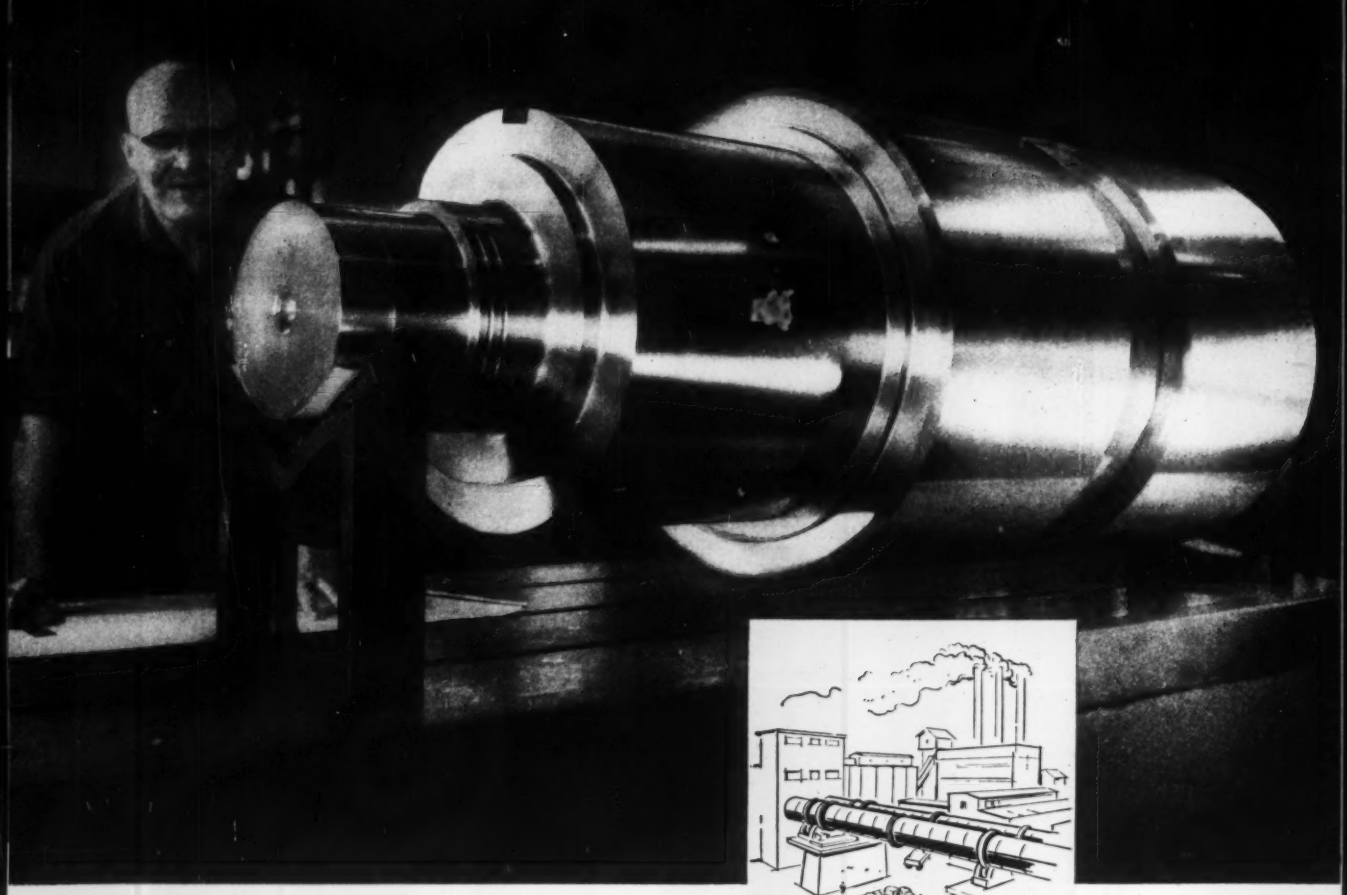
Each central receiving station of an IBM 357 System is served by up to 20 compact, wall-mounted input stations, strategically located near work areas to receive data directly from the production line. Facts fed into the input station are flashed to the recording center and automatically punched into IBM cards, ready for processing. The IBM 357 System is compact, economical, flexible. It can be expanded or modified at any time to handle changing needs.

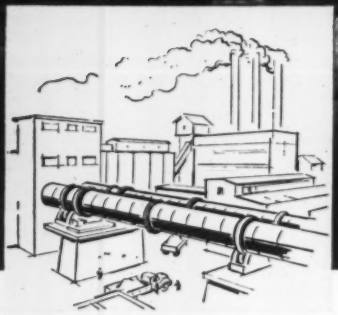
Your local IBM representative can tell you about the money-earning advantages of the new IBM 357 . . . call him today. The IBM 357 Data Collection System, like all IBM data processing equipment, may be purchased or leased.

balanced data processing

IBM®

Back of a Sack of Cement... This 4½ Ton Steel Forging





Give a thought to this the next time you drive a concrete highway or see a concrete block building. Only 8900 pounds of what it takes to make a sack of cement . . . a relatively small forged steel pinion shaft to drive cement mill machinery.

The large diameter is only 32 inches and the length only 8 feet—but it's a tough, dependable component of a vast manufacturing complex—the cement mill.

The smooth, bright finish is comparable to the gleaming surface of a 60 ton turbine rotor. Why? . . . Because the same careful metallurgical control, skillful engineering and precision production accorded the largest forgings we make are characteristic of this relatively small steel forging.

Place with us your simplest or most intricate forged steel components of any size or shape—you will like the results you get.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

NEW HIGH TEMP ALLOY—You can add Astroloy to your list of nickel-base high temperature materials. (It is not in STEEL's 1959 Metal Selector.) Typical chemistry: C 0.05; Mn 0.70 max; S 0.015 max; Si 0.10 max; Fe 0.20 max; Cr 15.0; Mo 5.0; Co 15.0; Ti 3.50; Al 4.30; B 0.03; Ni balance. Strong at 1800° F, it can be formed, forged, and welded. The alloy, developed by General Electric Co., is a companion to Rene 41.

MICROWAVES LINK COMPUTERS—Distantly located computers now can be hooked together without direct wiring. The system was developed by Pacific Telephone & Telegraph Co., and International Business Machines Corp., Los Angeles, for North American Aviation Inc. The apparatus transmits 3000 words a minute. Rental cost: $7000 a month.

TITANIUM COLD EXTRUDED—Immersion in a fluoride-phosphate bath coats titanium with a good lubricant retainer, claims Battelle Memorial Institute, Columbus, Ohio. That and self-drying gum resin lubricants provide the means for cutting extrusion pressures to practical limits.

GALVANIZED WELDING AID—Try brushing areas to be welded with a resin plastic before dipping parts in a galvanized bath, advises Furane Plastics Inc., Los Angeles. The resin chars and can be brushed off easily.

ELECTROPOLISHING IS CHEAPER—Zinc diecastings can be finished for 6 to 10 cents a square foot by electropolishing followed with a leveling zinc plating, says the American Zinc Institute, New York. That compares favorably with buffing costs which may run from 4 to 29 cents a square foot.

TAPE CONTROL IN THE FOUNDRY—Sometime in 1960, a tape controlled sandslinger will be ready for market. Aimed at providing uniform density in molds, the machine will use a pre-established pattern of sand filling. Main markets: Automotive and sanitary products, or others employing repetitive lots of the same castings. Developers: Micro-Path Inc., Inglewood, Calif., and Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago.

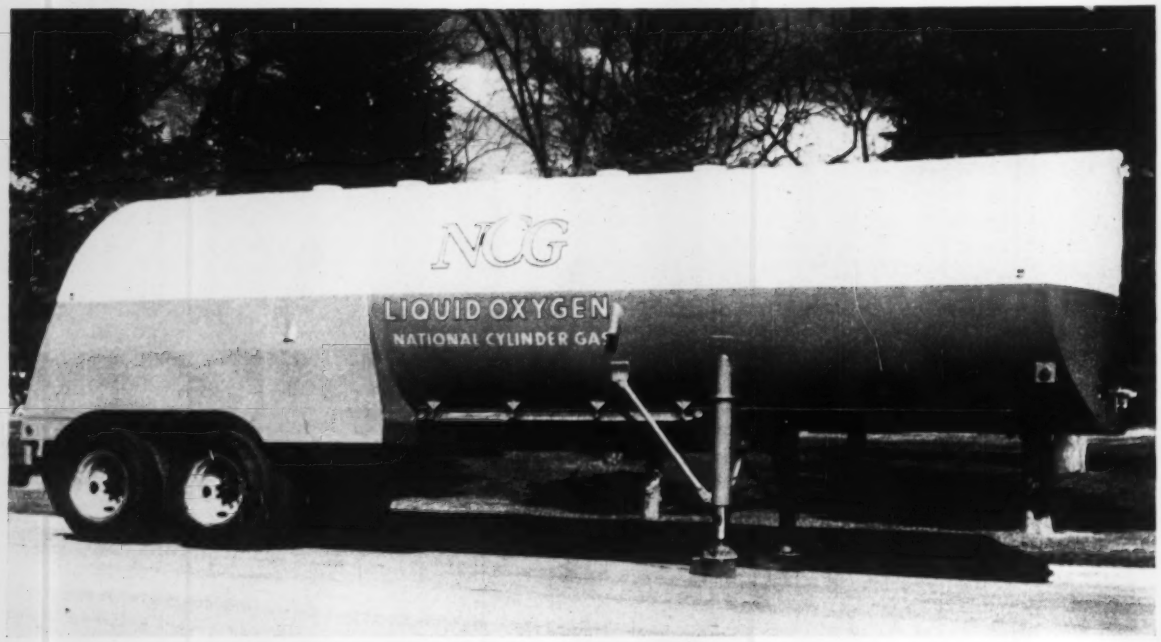
NEW SOAKING PIT RECORDER—A digital data system will replace conventional meter recording on soaking pit recuperators at Fairless (Pa.) Works, United States Steel Corp. Scheduled for early 1960, the system makes a typewritten record of temperature changes (instead of a graph), says Bailey Meter Co., Cleveland.

HIGH TEMPERATURE INSULATOR—Fibers of highly refined potassium titanate combined with a phenolic resin resist prolonged 1000° F temperatures and occasional bursts to 6000° F, claims Resisto Chemical Inc., Wilmington, Del. Goal: Improved missile and rocket insulation.

TORSIONLESS SPRINGS—Staggered slots machined in metal tubing make excellent springs which have no twist at the ends when flexed, says Dr. Werner Rohrs K. G., Sonthofen, Germany. Loading, elasticity, and response characteristics can be varied by changing slot size, shape, and distribution.

HONEYCOMB INSPECTOR—The problem of close definition in aircraft honeycomb inspection is eased by a new, x-ray fluoroscope which can check 4 in. panels at 145 sq ft an hour with a 3 per cent sensitivity (within Air Force specifications). The unit is automatic and makes its own permanent photographic record, claims Picker X-Ray Corp., Cleveland.

AC AND DC SUNLIGHT—A new device produces alternating and direct current directly from sunlight or heat. Called a ferroelectric converter, it is expected to find use in space communications and nuclear reactors, says International Telephone & Telegraph Corp., New York.



Aluminum increased loading carrying capacity of liquid oxygen semitrailer fabricated by Boulder, Colo., division of Beech Aircraft Corp.

Aluminum Beats the Cold

It's being used, for example, to store liquefied natural gas at 259° F. In choosing material for such applications, you must consider the influence of temperature upon strength and toughness to guard against metal failure

ALUMINUM containers are being used for the storage of liquefied gases because of the metal's ability to resist brittle fracture at low temperatures.

Within the temperature ranges required, steel shows a transition from ductile to brittle fracture. Aluminum is free from the problem, which explains its wide use in low temperature applications.

• **Background**—Cryogenics, a term once reserved for scientific papers presented before learned societies, is being heard more and more in metalworking—it refers to low temperatures which often approach absolute zero (−459° F).

• **Example**—Methane, the primary constituent of natural gas, cannot be liquefied at normal temperatures. To reduce the vapor pressure of the fuel to atmospheric, the temperature must be carried to −259° F or lower.

The problem was faced when the tanker, *Methane Pioneer*, was modified for the transportation of liquid natural gas to England by Constock International Methane Ltd. (The company is jointly owned by Continental Oil Co., Houston, and Union Stock Yard & Transit Co., Chicago.)

• **Advantages** — Aluminum tanks were fabricated with balsa wood insulation. The liquid and tanks make a light load, and it is possible to add ballast to trim the ship because of the double hull construction.

Reason for the interest in the liquefaction of natural gas for shipment is found in space requirements. The *Methane Pioneer* carries 33,000 barrels of the frigid fuel; when vaporized, it converts into about 115,000,000 cu ft of gas. Similar space savings are attained with other liquid gases.

After three trips, an inspection was made by the American Bureau of Shipping and by Lloyds Registry. No evidence of deterioration of the tanks or insulation was found.

• **Cryogenics**—When the decision was made to transport the gas at atmospheric pressure in insulated tanks, cryogenics studies were required to design the containers. One of the most important considerations was the question of brittle fracture. As a result of many tests, 5083 aluminum alloy was chosen.

Many metals and other materials undergo a change in their manner of stress failure as the temperature is decreased. (Salt water taffy pulls into a string when warm, but snaps when cold.) Other factors influencing the way metals fail include the presence of accidental or designed notches, or similar structural variations, resulting in local stress concentrations. Once failures start at such a source, they propagate rapidly and complete failure is the frequent result. Op-

erating conditions may impose high local loads, or high rates of load application, aggravating problems.

• **Metallurgy**—Basic metallurgical factors, as well as service conditions, influence the transition from ductile to brittle failure.

One is the hardness or strength of the alloy. In general, higher hardnesses and correspondingly higher strengths increase the chances of brittle failure. A cold chisel is made softer than a file; it must withstand hammer blows which the file does not receive.

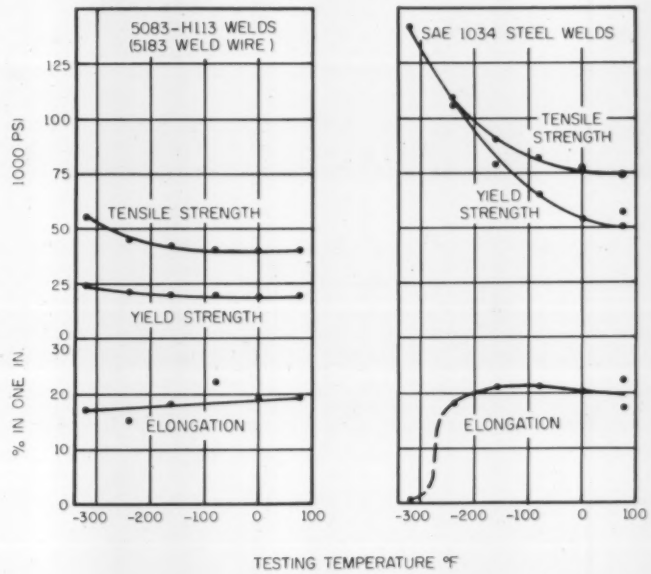
Microstructure is another factor in brittle failure. Coarse structures fail more readily than those of fine grain. A weld will contain metal of the cast structure, typically coarse; it is not usually possible to work the weld metal, so it may be a source of trouble. In other cases, the heat required for welding may affect the adjacent metal; it may be heated to a metallurgical transition zone where it is conditioned for a brittle type of failure.

• **Test Methods**—The testing procedures and the results obtained have been reported by Dr. R. D. Olleman, Department of Metallurgical Research, Kaiser Aluminum & Chemical Corp., Oakland, Calif. Aluminum alloy 5083 was compared with SAE 1034, a steel which has a typical ductile-brittle fracture. (When ferrous materials are to be used at low temperatures, alloys are employed.)

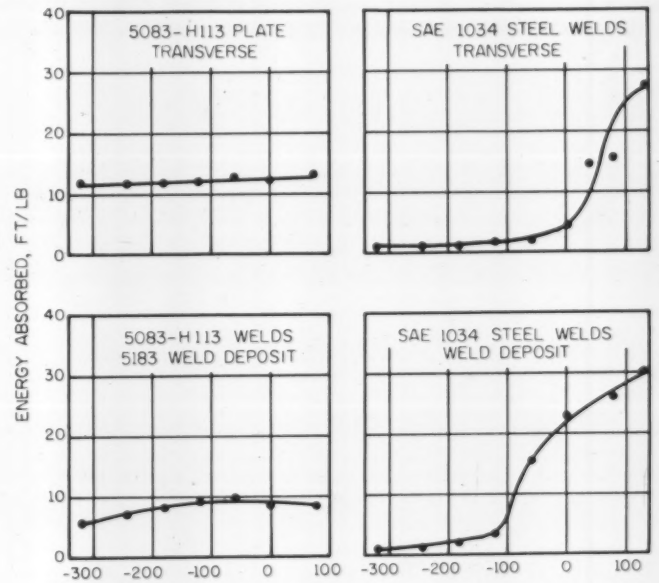
To differentiate among the factors influencing failure, several tests were run. Tensile tests at low temperatures show the effect of temperature alone, when compared with conventional ranges. Unnotched tensile impact tests add the effect of high loading or strain rate to the standard tensile test. Notch tests, both tensile impact and Charpy impact, add stress concentration or notch effect to the other two. Longitudinal and transverse sections were used, as well as samples of weld areas.

Test temperatures went as low as −320° F, far below the levels expected in the methane containers. The low temperatures were obtained with a controlled flow of nitrogen; a thermocouple measured the temperature of the specimen. The aluminum alloy samples were taken from ¾ in. thick plate in the H113 temper; the thickness is representative of heavy aluminum plate, and the hardness is higher than "O" temper, increasing the chance of brittleness. The curves show typical test results.

Transverse Tensile Properties



Charpy Test Results


5083-H113 PLATE TRANSVERSE
SAE 1034 STEEL WELDS TRANSVERSE
5083-H113 WELDS 5183 WELD DEPOSIT
SAE 1034 STEEL WELDS WELD DEPOSIT
ENERGY ABSORBED, FT/LB
TESTING TEMPERATURE °F

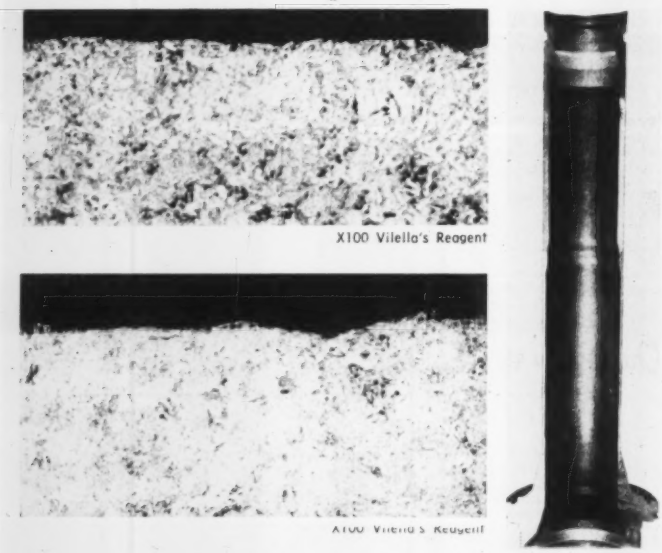
All tests on ¾ in. plates.

Experimental results of the aluminum alloy showed no sharp drop in elongation or impact values.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Peening Cuts Stress Corrosion

Tests on stainless indicate the process may permanently retard or eliminate cracking effects of high temperature water. It might work on other metals, too



Here is a cross-section of the 4 in., thin walled cylinder used to test GE's shot peening idea. Photomicrographs of two areas furnish proof that surface is unaffected after eight weeks' exposure in 300° F, air saturated water. Untreated samples fail after a week

STRESS CORROSION cracking, a bugaboo of boilermen and corrosion engineers, can be controlled in some types of stainless by shot peening, says Henry Suss, Knolls Atomic Power Laboratory, Schenectady, N. Y. (KAPL is operated by General Electric Co. for the Atomic Energy Commission.)

Samples of shot peened stainless withstood eight weeks' exposure in 300° F, air saturated water while holding a 60,000 psi stress. Untreated samples failed in less than a week.

The promise: The same treatment may also arrest or eliminate similar deterioration in other metal alloys.

• Cracking tendency of AISI 410 (Rc 36-42) is minimized by compressing or cold working a surface layer. That counteracts applied or residual stresses which are at the root of such failures.

These are the prerequisites for successful treatment: A properly designed product and a machine in which to shot peen it; adequate process and quality control procedures; and proper evaluation of the effects of environment, stress, and operating temperatures.

The protecting layer can be formed by surface rolling, but formed parts are more easily shot peened—the method KAPL chose for a thin walled, 4 in. ID cylinder used in a pressurized water reactor.

Propelling 0.007 to 0.066 in. shot from a revolving wheel or an air blast provides the means for compressing the surface grain structure. How deep it goes depends on intensity, which is measured by standard (Almen) strips. After exposure to a shot stream, the strips curve toward the peened side. Curvature is measured by a standard gage—arc height must be between specified limits. The longer the strip is exposed, the more the curve increases until it reaches a maximum value. Minimum time to reach that point is called "time for 100 per cent visual coverage." The idea is to expose the parts twice that long to make doubly certain exposed portions are completely peened.

• To establish shot size and peening intensity, choose values which won't significantly affect surface finish or cause distortion beyond allowable limits.

Some imbedding of shot occurs, but tests show it has little or no effect on strength or corrosion resistance.

KAPL uses cast steel shot, peening grade, which has been conditioned to insure good round surfaces with no protrusions. Broken shot is kept within half of regular military specifications.

Only areas to be peened are exposed. Three layers of tape protect other areas, particularly large V-threads—the intermediate layer is colored to insure completed coverage. Blind places like small holes or crevices have to be plugged and taped to prevent dirt accumulation. Both top and bottom surfaces can be peened at the same time.

• Conclusions: Exposure up to 450° F should not erase the compressive residual layer; shot peening leaves the base metal sound; the method may offer indefinite protection against stress corrosion cracking of hardened AISI 410 stainless or other susceptible alloys.

Operators probably will have little or no problem getting adequate coverage with peening if they will establish and follow a proper procedure, says Mr. Suss. Only the 4 in. cylinder has been tested—no other parts have been put into practical use, but Mr. Suss still feels results are encouraging.

Iron Rings Stop Oil Loss From Strip Mill Bearings

Chromium plated cast iron sealing rings help reduce oil losses from backup roll bearings on strip mills at a large eastern steel plant. They were developed by the Metal Products Div., Koppers Co. Inc., Pittsburgh.

Cast iron rings cost less than the softer ones used previously. Harder wearing surfaces on the rings help ring spacers last longer. That insures maintenance of the right ring fit, cutting oil losses, reducing contamination, and extending bearing life.

The rings were tested more than two years on hot and cold strip mills.

They should last three to five years under normal operating conditions, says John A. Worthington, manager of Koppers' piston ring and seal department.

Weight Saving Beryllium Boosts Missile Payloads

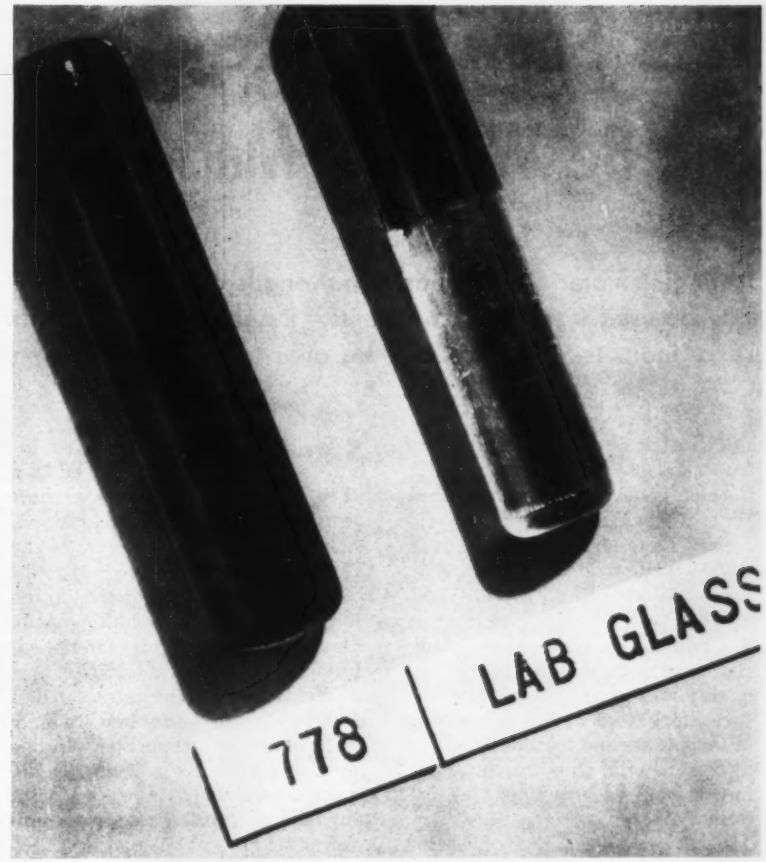
Beryllium fasteners fabricated by Standard Pressed Steel Co., Jenkintown, Pa., contribute significant weight savings to missiles and satellites. (See STEEL, Nov. 30, p. 61.)

Beryllium is one-fourth as heavy as ferrous metals, less than half as heavy as titanium, and only 70 per cent as heavy as aluminum.

Another consideration is its strength. A beryllium bolt can support a load of 125,000 psi, the equivalent of a steel bolt of the same weight with a strength of 500,000 psi. Potentially, 1 lb of beryllium bolts can do the job of 2 lb of the strongest steel bolts.

● **Degree of Development**—Beryllium is exceptionally notch sensitive. Threads or bolt heads, for example, do not necessarily have the same strength as the material from which they are made. SPS is confident it will solve the problem as it did in the case of titanium.

● **Other Uses**—Beryllium has excellent properties for use in nuclear reactors. The metal reflects neutrons and is corrosion resistant.



Corrosion resistance of Glascote 778 is demonstrated by coated steel samples immersed for one week in a 0.5 per cent lye solution at 200° F. Laboratory glass eroded four times faster

New Glass Staves Off Hot Acids, Alkalies

AN IMPROVED glass coating gives steel better corrosion protection than borosilicate types, claims Glascote Products Inc., Cleveland, a subsidiary of A. O. Smith Corp.

The company says that borosilicate glass is 65 per cent more susceptible to acid erosion and 400 per cent less resistant to alkalies than the new product, Glascote 778. When borosilicate glass is heated to 350° F, it shatters when plunged into 50° F water. Glascote even resists spalling under the same conditions.

Possible metalworking applications include linings for fittings, pipes, pumps, and tanks containing hot acids or alkalies (upper limit is 350° F); flue linings for metal stacks (upper limit for dry gases is about 500° F); degreaser containers; and railroad tank cars.

● **Limitations**—Tantalum is said to be superior to the Glascote, but its cost is higher. Zirconium is also better for some applications, as is titanium.

Some plastics (Kel-F and Teflon) are said to be superior, but, again, price is a factor.

Tests Show That Rene 41 Can Be Welded, Machined

Jet engine material which has high strength at 1200 to 1800° F may be used in frame components. Results at Rohr Aircraft Corp. indicate what you may be able to do

RENE 41, a vacuum melted, nickel base alloy used in jet engine parts, is being considered for frame components of high performance aircraft. Tests show it can be machined and welded, reports Rohr Aircraft Corp., Chula Vista, Calif.

• **Findings**—In welding, some special treatment was necessary, but quality was good. Both plate and sheet stock were welded in a variety of thicknesses and joint designs.

The material shortens cutter life, but it can be machined satisfactorily.

• **Welding**—One test involved inert gas, tungsten arc welding of 0.040 sheets in a square butt joint design with no root opening. A wire brush and filler wire of the base material were used in joint preparation. Argon was used in the torch, backup, and trailing cup. One pass was made on material solution heat treated at 1950° F.

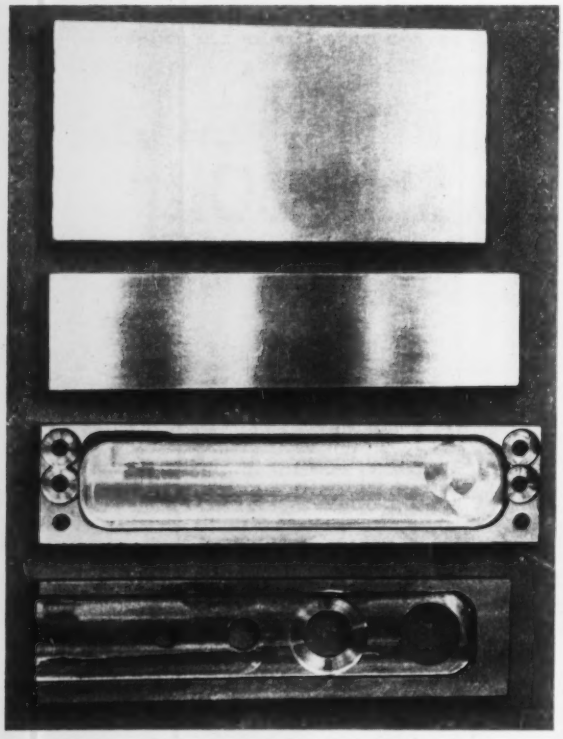
Welded parts were heat treated at 1400° F for 16 hours and 1650° F for 4 hours for comparison. In one test, specimens were bent 105 degrees over a 0.560 in. radius without failure. Tension tests were uniformly satisfactory. (Strengths were over specifications.)

Test log data: Following heat treatment at 1400° F (for 16 hours), yield strength ranged from 149,400 to 162,000 psi and ultimate strength from 185,500 to 196,800 psi. Three out of the four test fractures occurred at the edge of the weld (one in the parent metal).

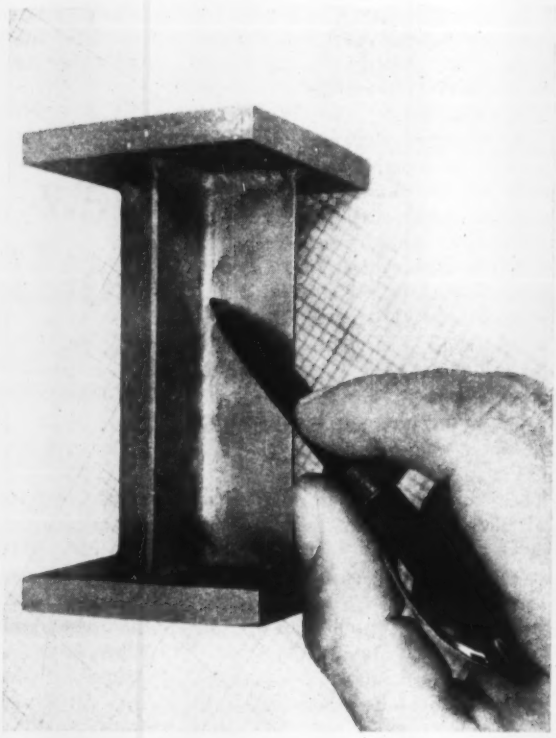
After heat treating at 1650° F for 4 hours, yield strength ranged from 127,300 to 130,000 psi and ultimate strength from 157,800 to 180,600 psi. All fractures were at the edge of the weld. In heavier materials (such as ½ in. plate) the pattern was similar, but fractures were usually in the parent metal.

• **Machining**—A test series showed that machining would be costly, but quality is good. Due to alloy structure, milling machines with maximum rigidity must be used.

The material tends to work harden quickly, says Rohr. Speeds and feeds must be low, and it's necessary to make big cuts and keep moving. Cutter life is low. Several solvents were better than conventional coolants. A friction saw proved best for rough cutting.



Test samples show machining quality of Rene 41 in a variety of cuts



No fixtures were used in welding this cruciform. Weld quality is good

Addition of Nickel Beefs New Alloy's Strength

A new family of high strength, 25 per cent nickel, alloy steels has been invented by C. B. Bieber, who is a research metallurgist for International Nickel Co. Inc., New York.

• **Mechanical Properties**—Air cooling imparts high strength properties to the alloys. Yield strength in excess of 250,000 psi with 6 to 10 per cent elongation and above 20 per cent reduction of area are obtainable.

Maximum hardness in excess of 67 Rockwell C has been achieved the company reports.

A change in the nickel content from as high as 30 per cent down to 20 per cent or lower varies the mechanical properties. The optimum combination of strength and ductility appears to be about 25 per cent nickel with the addition of 2 to 6 per cent titanium and/or aluminum to make the steels responsive to both precipitation and martensitic hardening.

The carbon content should be low—preferably below 0.05 per cent says Inco.

• **Applications** — The new steels possess excellent cold forming characteristics after a simple annealing treatment.

In that condition, the steels have a yield strength which is comparable to that of mild steel.

High strength properties are obtained without liquid quenching. Intricate parts can be fabricated to close tolerances while the steel is in a soft annealed condition and can be hardened to high strength levels without appreciable distortion. That makes it desirable for applications in aircraft and missiles and for high strength wear resisting precision parts, such as bearings.

The steels are weldable in the hardened condition without preheat.

That feature is expected to lead to important applications, such as in heavy wall pressure vessels and in heavy defense equipment.

The 25 per cent nickel steels are readily hot worked and can be produced in all the various commercial shapes.

Roll clamp accessory, attached to the lift truck, easily handles paper rolls weighing up to 7000 lb. Rolls can be lifted, lowered, or rotated 360 degrees

Change in Specifications Raises Lift Truck Capacity

Towmotor widens market for a standard product by changing to another alloy. In addition, it reaps fabricating advantages through improved weldability and cutting ease

SOMETIMES you can upgrade your product and increase sales simply by changing material specifications. A substitution made by Towmotor Corp., Cleveland, boosted the capacity of its one-man-gang lift truck.

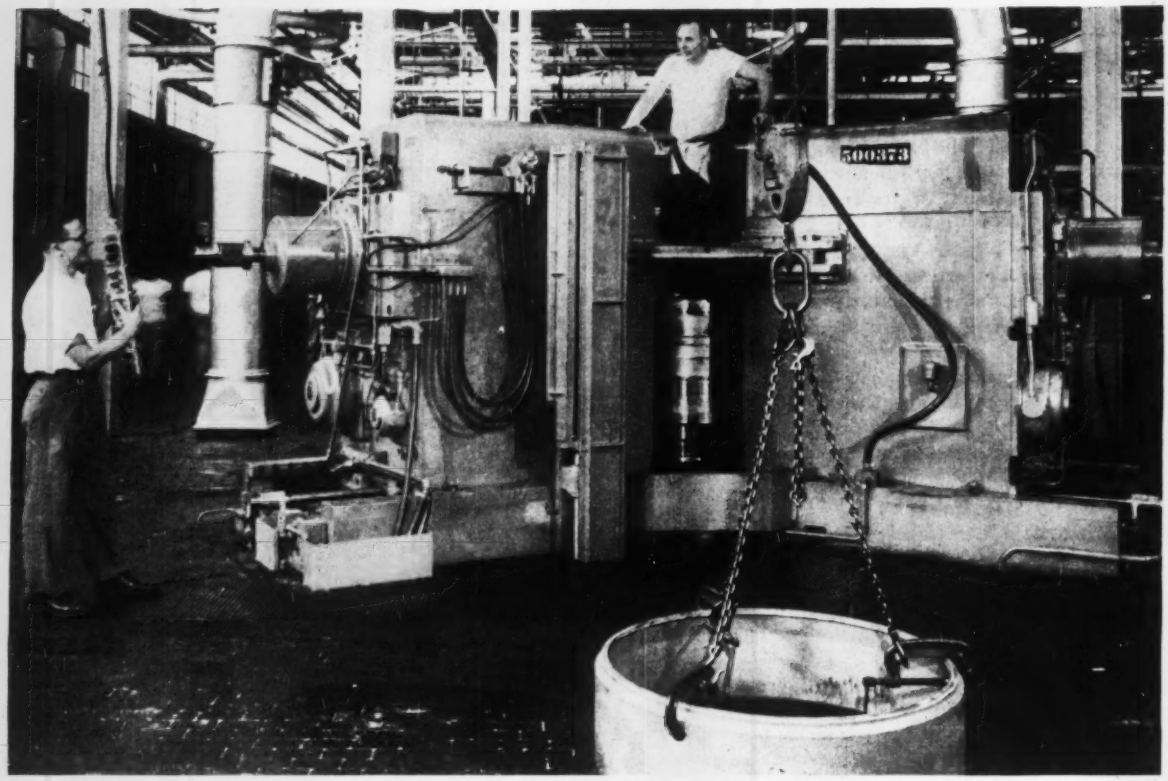
Towmotor was asked to develop accessory clamps for its lift trucks capable of raising, lowering, or rotating paper rolls weighing as much as 7000 lb.

Carbon steel clamps serve well in most applications. Because of the weight factor, Towmotor engineers decided it would be necessary to substitute a high strength to low weight ratio material since too heavy a clamp would cause the truck to tip when loaded.

The choice was Jalloy plate, a product of Jones & Laughlin Steel Corp., Pittsburgh. The weight of the clamp was reduced 20 per cent with no sacrifice to strength. Another advantage was ease of fabrication; Jalloy plate can be torch cut easily and is readily welded.

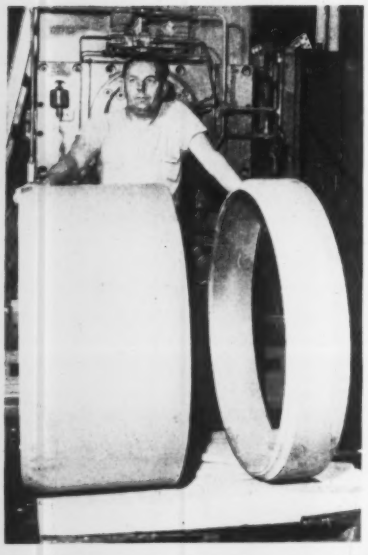
Weldability permitted the rapid assembly of the parts comprising the clamps resulting in a stronger joint.

Use of the alloy solved the problem of wear by abrasion. In operation, the clamp occasionally scoops under the load to lift a paper roll lying on its side on concrete floors. The abrasive resistance of the alloy increased the life of the lower member of the arm.



Standing on the vertical mandrel, operator Clarence Lasky is surrounded by the power heads for the forming rolls. The 250,000 lb machine was built by Lodge & Shipley Co., Cincinnati

Machine Shapes Giant Missile Cases



Mr. Lasky shows how a casting can be elongated (left) with flow turning

Flow turning techniques elongate cast steel or titanium rings into high strength pressure vessels. The turned cylinders can be up to 20 ft long and 80 in. in diameter

OUTSIZED, one piece missile and rocket cases are being flow formed. The job is being done on a huge machine at Pratt & Whitney Aircraft Div., United Aircraft Corp., East Hartford, Conn.

Leonard C. Mallet, general manager, says the machine is designed to work on cylindrical shapes with diameters of as much as 80 in., lengths to more than 20 ft, and wall thicknesses of as little as 0.015 in.

• **Process Block** — Some orthodox processing methods can't be used. Mr. Mallet points out that many of the cases are not acceptable with a longitudinal weld, so rolling and welding are out.

Cylinders are cast, then lengthened under the forging forces exerted by the new machine's rolls which traverse down the part.

• **High Strengths**—Both high property steel alloys and the relative newcomer, VCA titanium, have been worked into cases. Experimental tests on pressure vessels made of the titanium show a yield strength equivalent to 300,000 psi in steel.

Mr. Mallet says the company has demonstrated that it can attain consistent yield strengths of 240,000 psi in full scale rocket cases.

Fish Scale Proves Cleveland Tramrail Easy Rolling

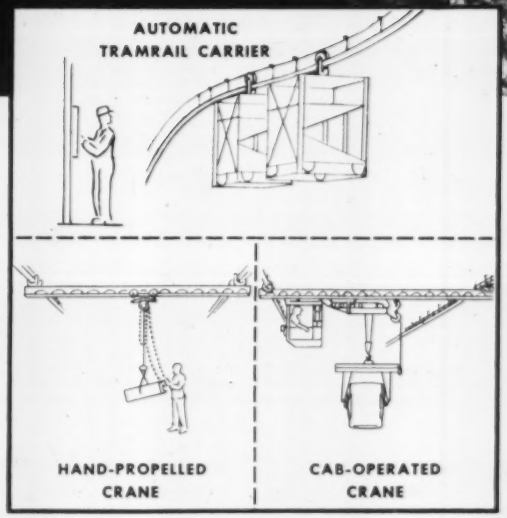
FOR decades Cleveland Tramrail has advertised the following guarantee covering all cranes and carriers it produces:

Guaranteed Starting Effort 15 lbs. and Running Effort 10 lbs. Per Ton Weight.

Recently a machinery manufacturer used a fish scale to check the pull required to move his hand propelled Cleveland Tramrail crane, which was loaded with a machine weighing 1750 lbs. The crane itself, including hoist carrier, weighed 913 lbs. The total load, therefore, was 2663 lbs.

The test indicated a pull of 12 lbs. was required to start the load and 10 lbs. to keep it moving. On the basis of ton weight moved, the starting effort was 9 lbs. and running effort 7½ lbs. Obviously, the test proved the soundness of Cleveland Tramrail's guarantee.

Because of a number of outstanding design features, all Cleveland Tramrail equipment is unusually smooth operating, whether it be hand propelled, motor-driven, or completely automatic. In fact, Cleveland Tramrail equipment rolls so easily that often hand propelled equipment can be used where motor-driven is normally found necessary.



CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

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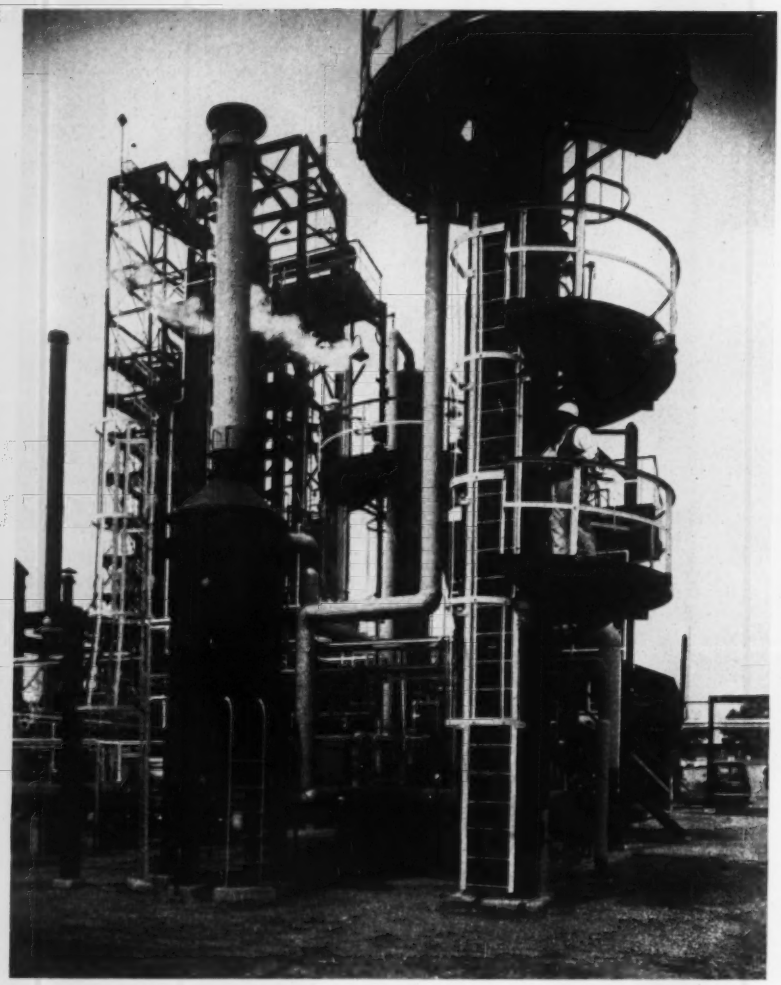


Hydrogen for reduction of iron ore is produced by partial oxidation of coke oven gas; the raw gas is purified by a water shift reaction and scrubbing

Modified H-Iron Process Produces Metal Powder

Raw product from the fluidized bed reactor is protected from reoxidation by a nitrogen atmosphere until it can be passivated by heating in a nonoxidizing environment

IRON POWDER is being made at Alan Wood Steel Co., Conshohocken, Pa., by the H-Iron process, a direct reduction technique developed by Hydrocarbon Research Inc., New York, and Bethlehem Steel Co., Bethlehem Pa.

Further refining, by processes developed at Alan Wood Steel, prepares the product for use in powder metallurgy or steelmaking. The plant will make 18,000 tons of iron powder a year, using mill scale or high grade ore as raw material.

• The metallic product can be used in powder metallurgy, or briqueted and used as melting stock.

Most iron powder is used to make molded mechanical and structural parts, welding rod coatings, metallic friction materials (clutches and brakes), electrical cores and magnets, or for powder cutting and scarfing.

The material can also be briqueted and used for special melting material in making steel alloys and castings. Examples: Electrical and magnetic alloys, high temperature alloys, and vacuum melted steels.

• Iron ores are processed in the raw material preparation section before they are reduced.

The H-Iron process removes oxygen from the ore to make metallic iron. But it doesn't eliminate gangue or waste material from the charge. To produce iron powder in metallurgical grades, the ore must be virtually pure iron oxide. And particles must be small if the H-Iron process or any other fluidized bed technique is used for reduction. Magnetite ore from the company's mine in northern New Jersey has the right chemical and physical properties.

The company has installed equipment at the plant for preparation of other ores. The materials pass through a rotary dryer; then waste material is eliminated in a magnetic separator. Particles are ground to the right size for fluidizing in a ball mill, which is operated with a classifying system.

• Reaction of coke oven gas and oxygen produces hydrogen, which is used as a reducing agent.

Byproduct gas from the company's coking operation is reacted with oxygen in a fuel rich mixture under pressure. Only enough oxygen is supplied to convert hydrocarbons in the coke oven gas to hydrogen and carbon monoxide. (Complete combustion would produce carbon dioxide and water.)

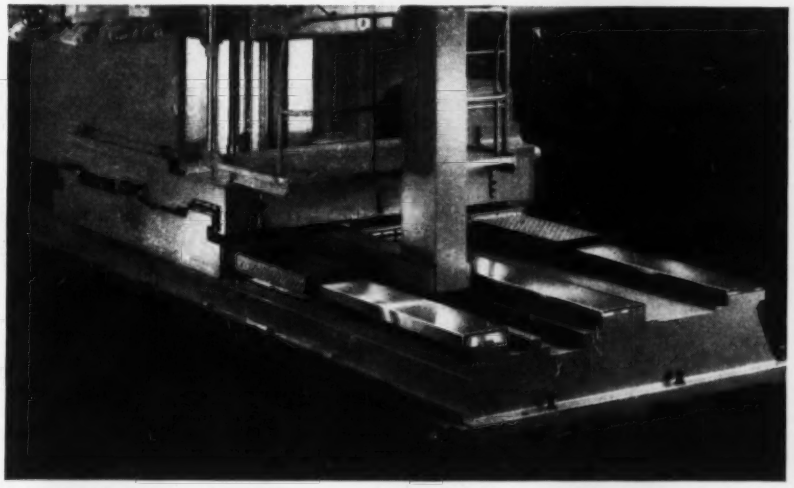
The reaction is controlled by maintaining the right reaction temperature and by keeping hydrocarbons and carbon monoxide in the product gas at the lowest possible level.

The gas is saturated with water and subjected to a water shift reaction, to convert carbon monoxide

O-KNI-CO MACHINE TOOL news

PRODUCTION FACTS THAT INCREASE YOUR PROFITS

PUBLISHED BY THE OHIO KNIFE CO., CINCINNATI, OHIO



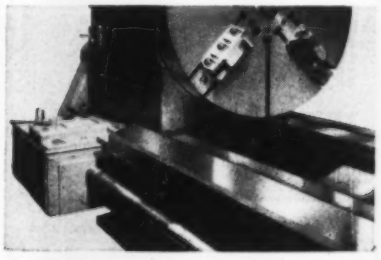
O-KNI-CO hardened bedways, cross ways on new GRAY 650 FC horizontal boring machine.

Big machine tool builders solve wear and accuracy problems with quality O-KNI-CO processed hardened ways and wear plates

The G. A. Gray Co., The Niles Tool Works of the Baldwin-Lima-Hamilton Corp., The Gisholt Machine Co. are among the many users of O-KNI-CO products.

By a time proven process, special analysis tool steel of any thickness is eternally bonded to a soft, tough, easily machinable steel, producing a superior way that will not warp or bow. Special O-KNI-CO hardening process (65-66 Rockwell C) to the full depth of the tool steel, along entire length of the way, develops amazing wear-resistant qualities.

Ordinary ways of one type steel, are usually heat treated by flame hardening, carburizing, or some similar process. This results in variations of depth and quality of hardness along the length of the way. The degree of hardness is usually well below the minimum standard (63 Rockwell C), necessary to eliminate galling, scoring and excessive wear. These conditions destroy the accuracy of the machine almost from the first day of operation, requiring continuous compensations in positioning of work.



O-KNI-CO processed hardened ways on 60 inch lathe made by The Niles Tool Works.

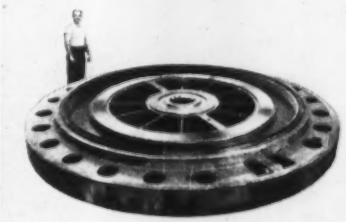
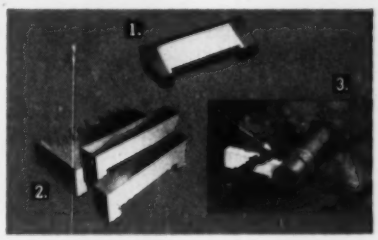


Table of Niles 20 foot vertical boring mill, inverted to show O-KNI-CO wear plates.

O-KNI-CO processed hardened ways are carried in stock in a variety of sizes and shapes, or made to suit your specific requirements. They are a perfect mating surface for either metal or non-metallic bearing surfaces. O-KNI-CO processed clad aluminum bronze wear plates are made by the same process and are available in standard stock sizes for quick delivery.

Gisholt Machine Co. gives amazing demonstration to prospective lathe buyers

Prospective lathe buyers witnessed an amazing demonstration of OK Bedway hardness at The Gisholt Machine Co., Madison, Wisconsin. Gisholt uses OK Ways exclusively on their ram and saddle turret lathes, and to prove their quality they (1) took a section from an OK Bedway, (2) made it into a tool bit, (3) locked it in a fixture and cut spiral shavings from 1045 cold-rolled steel.



Ohio Knife Co., big supplier of shear blades to equipment builders

Special O-KNI-CO heat treating techniques applied to shear blades give maximum toughness and superb edge holding qualities. Various grades are available for shearing. OK Battle Axe blades shear up to ¼" mild steel, OK Dura-chrome blades for shearing hot or cold plate up to 1¼" and OK Utility blades for short runs and heavy plate.

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to carbon dioxide. Final scrubbing removes the carbon dioxide and any remaining carbon monoxide.

• Hydrogen reacts with iron ore in the reducer to produce iron powder.

Ore is processed in three fluidized beds, where it's reduced by gaseous hydrogen.

The first bed provides about 47 per cent reduction; purity of the metallic iron is boosted to about 87 per cent in the second bed. Output from the third bed is said to be more than 98 per cent pure.

Hydrogen enters the beds at 500 psi. (High pressure speeds the reaction by insuring good contact between hydrogen and the ground ore.) The reaction temperature (1000° F) is low enough to prevent iron particles from sintering and sticking to the vessel.

Ore and metal particles are carried from one phase of the process to another by a technique called dense phase transport. (Fine ground material flows through a pipe from one vessel to another that is at lower pressure—movement is much like the flow of a liquid.)

• The product is upgraded in the finishing section, for use in powder metallurgy.

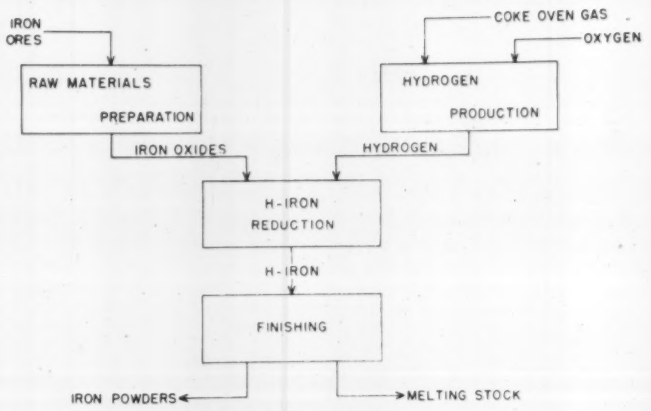
Powder from the H-Iron reduction section is kept in a nitrogen atmosphere to prevent reoxidation by the air.

Material that has been made into welding rod coating, cutting or scarfing powder, or melting stock briquets is subjected to a temperature of 1200 to 1600° F in a nonoxidizing atmosphere, for passivation. When the material is to be used as molding powder, it's put in pans and passed through a roller hearth furnace, where it is heated to about 2000° F in a hydrogen atmosphere. Then it is cooled to room temperature.

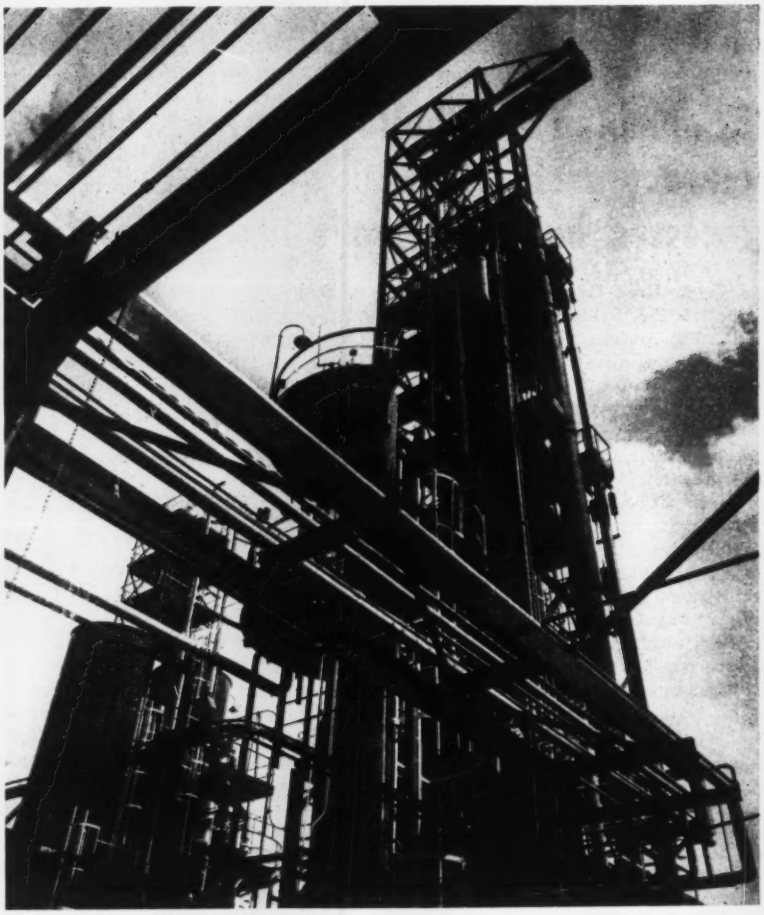
The stabilized iron powder is processed for several applications. Properties are controlled by passing the material through equipment that adjusts particle size, bulk density, compactibility, green strength, and tensile strength.

Finished powders are blended to insure the right particle size distribution. Additives, often desired by the customer, are introduced during blending.

How Fluidized Beds Make Iron Powder:



Raw ores are converted into virtually pure iron oxide before they enter the H-Iron reaction. Metallic iron from the process can be used in powder metallurgy, or for special melting stock



Ore is changed into metal in the reducer, where it comes in contact with hydrogen. The gas is under high pressure, but the temperature stays under 1000° F

Once again...
a warm "good cheer"
for the
Brightest Season
of the Year

The special brightness of the holiday season is reflected in the shining faces of the many household servants made of Brass . . . honest, solid Brass that's a faithful lifelong friend on every job it's called upon to do . . . in a word, Brass that's made "Bristol-fashion." Prove it . . . *in your own product.*

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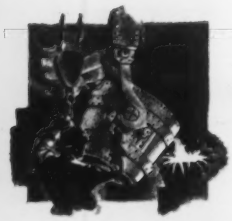

AMERICAN ORIGINALS IN IRON AND STEEL

The forge in the chimney corner

As our nation continued to expand after the Revolutionary War, one of its most pressing needs was for greater production of simple, flat, iron nails. The nails of that time generally were crude fastenings, hammered by hand from strips of metal. The process was inefficient and time consuming. But, the need was so great that even children in the home were pressed into service as nail makers.

In 1789, a Member of Congress stated: "It has become common for our country people to erect small forges in chimney corners. Great quantities of nails are made . . . even by children." But a year later, in 1790, the situation was suddenly changed by a Jacob Perkins of Newburyport, Massachusetts. Perkins, a mechanical genius of his time, invented a nail-making machine capable of producing 200,000 nails per day, and thus brought an end to the task of household nail making.

* * * *

Many men, machines, methods and materials have contributed to the development of our iron and steel industry. We at The J. E. Baker Company are proud of the fact that, for many years, steel makers have relied on Baker's Magdolite and Jebcolite, the original dead-burned dolomites for more uniform ingots, greater furnace efficiency, and lower refractory costs. Magdolite and Jebcolite offer many advantages . . . in superior composition, preparation, strength, economy and quality.

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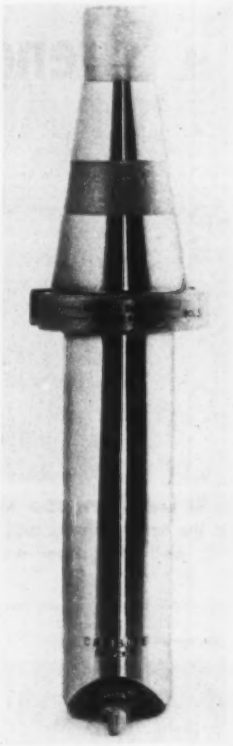
THE COST CRISIS . . . How to Beat It

Switch to preheat treated alloy for tools like this boring bar . . .

1. Eliminates heat treat costs and transportation to and from an outside firm.
2. Cuts grinding time and reduces stock allowance for grinding by 50 per cent.
3. Greatly reduces in-process inventory. Delivery is much faster.
4. Eliminates retapping of close tolerance holes.



Material Switch Leads to Price Cut

Preheat treated raw material saves up to two later treatments and several retapping and honing operations needed to counteract distortion. Costs are down 25 per cent

CHANGING STEEL from AISI 8620 and 4140 to a 4150 type called HyTen B3X paid off with a 25 per cent reduction in over-all costs for Beaver Tool Co., Gaylord, Mich.

It also led to a cut in selling prices which kept them competitive. (The firm makes boring bars, keeper keys, and a precision boring unit.)

Other advantages include better quality and faster delivery with a reduced inventory.

• **The former materials sometimes required two heat treatments and subsequent retappings and honings.**

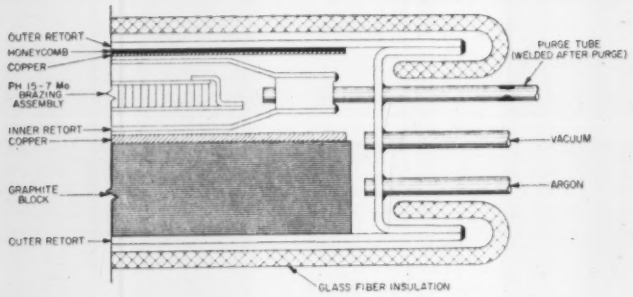
Parts used to be carburized and hardened; those made of 4140 were hardened to a low Rockwell (C scale). Parts were machined, sent outside for heat treatment, then returned and finish machined. Occasionally, they had to be heat treated a second time and touched up by honing close-tolerance holes and retapping threaded ones.

The outside heat treating also added to production time. That meant a larger inventory was necessary to meet customer needs.

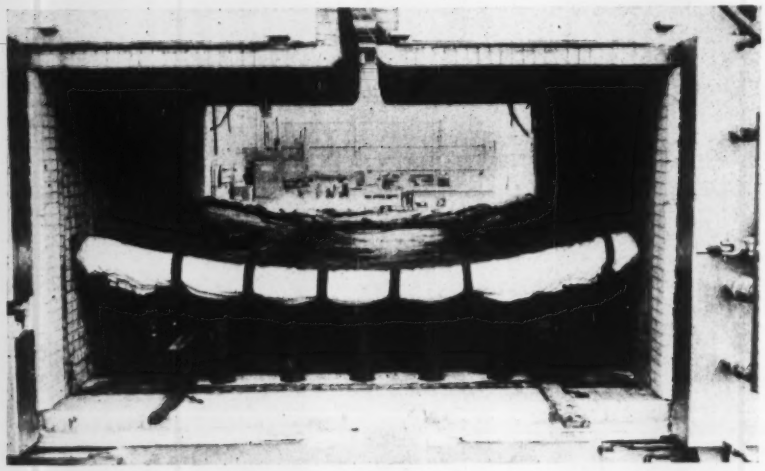
The new material is heat treated as-purchased, but it can be machined. It is still profitable to only grind some parts since less stock is removed and no allowance is needed to compensate for heat treating distortion. (In some cases, stock is reduced more than 50 per cent.) The switch also permitted elimination of all retapping after heat treatment.

Although HyTen B3X costs more than the other alloys, savings in production, paperwork, and the inventory cycle have more than offset the increase. Beaver makes 1800 tool items—300 of which are various kinds of boring bars.

Retort Brazing Turns Out High Strength Honeycombs



Technique of brazing PH 15-7 Mo steel inside sealed retort produces panels that withstand the temperatures and stresses of supersonic flight. Layers of copper, honeycomb, and glass fiber insulation aid uniform heat penetration



Honeycomb panel assembly for B-70 bomber nestles on piers of a leveling device, ready for brazing. Slot in top of luminous wall furnace permits loading work into furnace suspended on conveyor hangers

INFRARED HEAT and a new brazing technique make the honeycomb wing sections of the B-70 Valkyrie chemical bomber among the strongest structures built for aircraft.

Strength requirements for the wing panels reach 200,000 psi yield and 225,000 to 265,000 psi tensile.

North American Aviation Inc., Los Angeles, fabricates the honeycomb structures from PH 15-7 Mo (a precipitation hardening stainless steel developed by Armco Steel Corp., Middletown, Ohio).

• The brazing method makes it possible to produce panels 14 ft long and 10 ft wide.

Brazing is done in a static atmosphere, luminous wall furnace built by A. F. Holden Co., Detroit. A gas-air mixture burning at the face of the porous furnace lining transfers heat to the work in the form of infrared radiation. Within 1 minute after ignition, an operating temperature of 1700° F can be reached.

• Getting the large panels ready for brazing calls for extreme care.

Each wing core consists of 3/16 in. cells, ¾ in. high. The PH 15-7 Mo is 0.0015 in. thick. The core is sandwiched between 0.020 in. thick sheets of the same alloy. Edge members are 0.032 in. thick Z-angles with 1 in. legs.

Between the core and outer skins are placed thin sheets of brazing alloy—92.5 per cent silver, 0.5 per cent lithium, and 7 per cent copper. To hold core, skins, and edge members together for brazing, they are spotwelded in position.

• The honeycomb sandwich is brazed in a stainless steel retort.

Except for an open purge tube, the retort is welded and completely closed off. The entire assembly is supported on a graphite block within a larger, outer retort, forming a seal within a seal.

Uniform heat transfer is enhanced by laying a sheet of ¼ in. copper over each side of the inner retort. As added insurance, a sheet of ½ in. honeycomb core is placed above the copper on the side opposite the graphite.

Thermal out-of-balance during the brazing cycle is eliminated. The upper panel side heats and cools at the same rate as the lower side supported by the graphite block.

The final major step is to wrap a shroud of glass fiber insulation around the outer retort. That prevents thin work sections from getting too much heat and warping or cracking.

• Before the sandwich is put into the furnace, the inner retort is purged and the purge tube is welded.

The outer retort is evacuated, filled with argon, and sealed. Suspended on conveyor hangers that slide through a slot in the ceiling, the brazing assembly is positioned in the luminous wall furnace.

Heat is applied and gradually raised over a 4½ hour span to the brazing temperature of 1625° F. After 18 minutes at that level, the assembly is cooled to 1000° F in 1½ hours, then to room temperature.

The brazed sandwich is transferred from the furnace and packed in dry ice. It is held at −110° F at this stage of the treatment for 5 hours while still in the retort.

Plastic Design Cuts Construction Costs

YOU can get more for your steel construction dollar by taking advantage of the plastic design concept. Technically speaking, it proves that steel can be stressed beyond its yield point without failure. To the layman, it means a given amount of steel will do more work than was formerly thought possible.

So far, application has been limited to the construction of buildings—savings in steel as high as 15 per cent are reported. But the concept can be extended to other structures, believes Dr. J. B. Scalzi, associate professor of structural engineering, Case Institute of Technology, Cleveland.

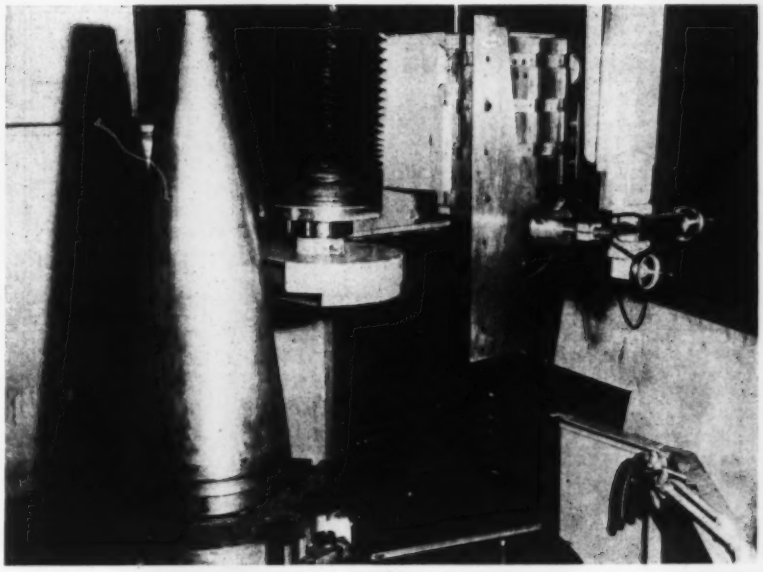
The theory is sound. It has been approved by such organizations as the American Institute of Steel Construction, the American Society of Civil Engineers, and the Welding Research Council. Lehigh University, Bethlehem, Pa., has invested more than a dozen years of research on it.

• **How It Works**—The concept is based on this idea: A single piece of steel which is part of a structure will support more weight than a piece of steel which is not part of a structure.

Conventional design theory (called the elastic concept) treats each piece of steel as if it were not part of a structure. So it establishes a lower load carrying capacity (roughly 20 per cent) than the plastic concept, which recognizes that a given load on a single piece of steel is distributed over a larger area.

• **One More Step**—Dr. Scalzi believes it may be possible to go beyond the plastic limit. He says:

"Now that designers and recognized standards authorities appreciate the plastic idea, it may some day be possible to extend it and permit some strain hardening to occur. That cannot be done, of course, until adequate experiments are conducted . . . to prove physically that structures can withstand loads which appreciably exceed the yield strength of individual members."



The mandrel (left) for a Nike Hercules nose cone is being contoured by grinding. The stylus and template assembly are at right

Vertical Cut Grinder Handles Tricky Curves

Automatic head swiveling keeps the grinding wheel face tangent to the work surface. Advantages include: Speed, smooth finish, and less grinding wheel wear

MISSILE nose cones and exhaust nozzles must be finished to precise contours. Many are designed as complex, nonlinear curves that pose tricky machining problems.

Douglas Aircraft Co. (Charlotte, N. C.) uses a Model 75 precision contour cut grinder with three-output tracer control. The machine (made by Bullard Co., Bridgeport, Conn.) has a 66 in. capacity table and vertical clearance for pieces up to 75 in. high. Curved contours can be ground on either internal or external surfaces of such materials as high heat resisting steels and ceramics. Examples of contours being designed: The venturi shape of an exhaust nozzle and the parabolic curve of a nose cone.

In addition to conventional two axis control over horizontal and vertical feeds to the grinding head, the unit also has automatic head swiveling. It keeps the grinding wheel face tangent to the work surface. Line contact grinding with a straight faced wheel is fast and gives a smooth surface finish. Other advantages: Grinding wheel wear is reduced, and less frequent dressing is required.

• **Operation**—The tracer head follows the template and generates three different electrical outputs controlling different motions. The outputs are electrically amplified and modify direct current flowing to the three motors driving the horizontal feed, vertical feed, and the swiveling motion. The ram head (which carries the grinding spindle) and tracer head are mounted side by side on the same crossrail. Both heads swivel and are connected by a system of crosslinkages that provide parallel movement. A side head can be provided for such uses as grinding radomes.

HOT SPOT in *your* plant?

Chances are 1 in 3 that your plant will have an electrical fire this year. Here's how to guard against it.

In a recent nationwide industrial survey, 29% of the reporting plants had one or more electrical fires during the past two years. Best protection against larger electrical fires? Install a fully-automatic Kidde carbon dioxide fire extinguishing system.

Finest fire protection on the market today, Kidde systems give you 24-hour-a-day protection, act quickly, dependably at the first sign of fire. Kidde systems are pressure-operated, self-contained – need no outside power. Visual indicators show if system is "set" or "released." All parts can be tested without discharging system. No parts to replace after operation or test. All operating parts completely enclosed for safety. Fast, clean carbon dioxide snuffs fire in seconds, then vanishes. Leaves no mess to clean up later, can't harm electrical gear. For more information, write for Kidde's Pressurized Systems booklet today.

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Solder Clad Stampings Join Dissimilar Metals

Strips of base metals (nickel, Kovar, molybdenum steel, and others) are clad on one or both sides with tin-lead solders, silver, gold, and related alloys in a bonding process developed by Alloys Unlimited Inc., Long Island City, N. Y.

The clad strip is stamped into discs, washers, and special shapes for use in automatic joining operations. They are also used as heat sinks, base rings, or tabs, diaphragms, and contacts for electronic applications.

New refining techniques permit the company to supply clad stampings in purity and dimensional tolerances dictated by critical applications, such as semiconductor devices.

Epoxy Resin Guards Stack In Corrosive Atmosphere

An epoxy resin coating protects the inside of a continuous pickling line exhaust stack from acid fumes and condensation at Acme-Newport Steel Co., Newport, Ky., a subsidiary of Acme Steel Co.

The coating material is produced by Fibre Glass-Evercoat Co. Inc., Cincinnati. Called FE-103 chemically resistant epoxy coating, it is based on Shell Chemical Corp.'s Epon resin 820.

The coating, troweled on the interior of the stack during a weekend shutdown, cost $1800. When it was inspected two years later, it was intact and serviceable, except for four pinhole bubbles that were easily repaired, says John E. Wentz, project engineer.

The exhaust system is rubber lined up to the breeching in the stack.

Lehigh Gets Spectrograph

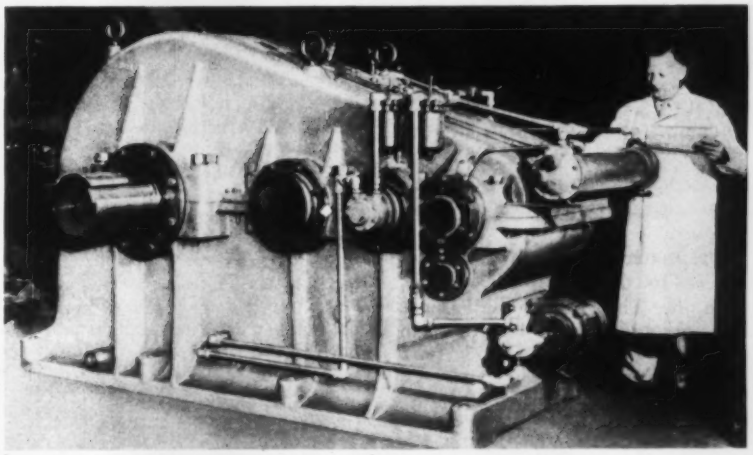
An emission spectrograph is being used for instruction and research at Lehigh University, Allentown, Pa.

The instrument, valued at $15,000 to $20,000, was donated to the university's Department of Chemistry by Carpenter Steel Co., Reading, Pa. It is used to determine the chemical analyses of steels.

Helical Speed Reducers Rated up to 815 hp

QUADRUPLE reduction, helical speed reducers are precision ground to obtain minimum noise, vibration, and backlash.

The grinding process has increased accuracy of tooth profile, profile spacing, and surface finish. Benefits: 1. Load carrying capacities are increased without sacrificing performance. 2. Running in is eliminated and gear life is extended. 3. Smoother tooth contact eliminates vibration. Gear noise is reduced and is no longer a problem in enclosed areas. Gears and bearings are lubricated from an oil reservoir. Where splash lubrication is not desired, an oil pump is used.



They're available in AGMA ratios from 106:1 to 650:1 with ratings up to 815 hp and an efficiency rating of 95 per cent. AGMA standards are met for the most severe overhung load and shock conditions.

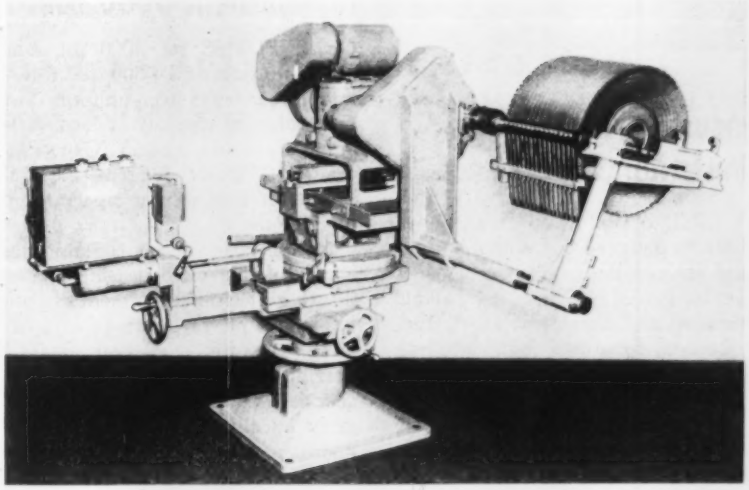
For further information, *write* Philadelphia Gear Corp., 3620 G St., Philadelphia 34, Pa.

Machine Buffs, Polishes Parts with Obstructions

PARTS which have obstructions that prevent complete rotation can be automatically buffed or polished on the Acme oscillating arm type machine.

The machine has an Acme E-10 semiautomatic machine with an air cylinder advance and an oscillating arm fixture. Parts can be mounted on an arbor with a locator and square drive. Then the arbor and part assembly are positioned in the oscillating arm unit by an air powered tailstock. Other special types of part chucking arrangements can be provided.

With the parts positioned, an air cylinder control advances them into contact with a buffing wheel mount-



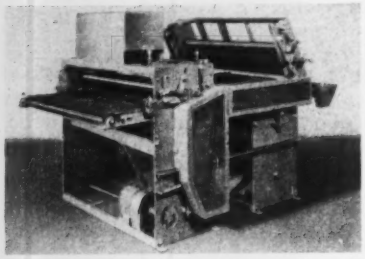
ed on a conventional double end lathe or an adjustable lathe. A pushbutton initiates a timed sequence of arm oscillation to give the desired wheel contact time.

For further information, *write* Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

Roller Coater Handles High Viscosity Materials

A ROLLER COATER (Model CG) is designed for use with high viscosity materials or compounds. The upper applicator roll is hinge mounted so it can be opened for easy cleaning.

The materials or compounds are applied to the rolls by "ironing" them on. The "ironing" eliminates foaming, and reduces the problem



of handling stringy compounds. For extra heavy coatings, or when a conditioner must be applied to the work before the final coating is applied, the roller coaters can be used in tandem.

For more information, *write* Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

Industrial Fans Handle Dust, Abrasives, Fumes

A LINE of industrial fans (Series 400) is designed for both material and air handling applications. They can be applied to handling granular, abrasive, and fibrous materials, dust collection, fume and high temperature exhaust, and similar industrial processes.

The open material wheel has flat radial blades for easy maintenance. A backplate material wheel is also available for stringy or slugging materials. An air wheel with backwardly inclined blading (for higher efficiency) is used for handling clean air, fumes, and light industrial dust.

For further information, *write* Dept. T-000, Sturtevant Div., Westinghouse Electric Corp., 200 Readville St., Hyde Park, Boston 36, Mass.

NIAGARA OBI PRESSES are turning out auto license plates at Auburn State Prison, Auburn, N. Y. Two installed in 1959 will have paid off their cost and saved $50,000 in addition before yearend. The presses are built in 14 standard sizes (geared and nongeared) with shaft diameters from 1¼ to 7½ in. Capacities range from 5½ to 250 tons. The presses are equipped with an instant engaging, low inertia friction clutch and brake operating directly on the crankshaft. Rigidly supported gearing runs in a sealed oil bath. Accessories include an adjustable speed drive, automatic feeds, and an automatic centralized lubrication system. For further information, **write** Niagara Machine & Tool Works, Buffalo 11, N. Y.

Gear Pump Line Rated For Constant 3000 psi

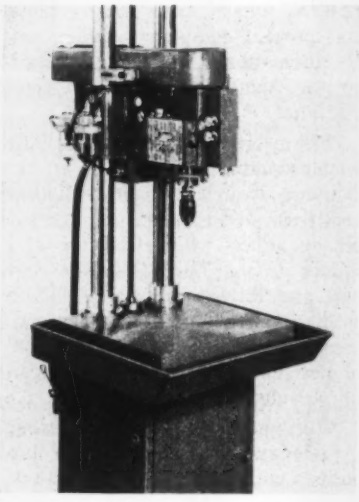
GEAR PUMPS for 3000 psi constant pressure and 4500 psi intermittent service deliver uniform flow (regardless of viscosity or load variations, says the maker). Capacities are 5, 10, 15, or 30 gpm. Special pumps are available in capacities up to 100 gpm.

Needle bearings are contained in a pair of one piece bearing blocks, insuring precision alignment of both gears and needle bearings at operating pressures. A rear floating bearing block is urged against the gear faces by hydraulic pistons and automatically takes up wear and maintains zero end clearance. Special mounting details can be provided.

For further information, *write* Superior Hydraulic Div., Superior Pipe Specialties Co., 15201 St. Clair Ave., Cleveland 10, Ohio.

Vertical Drilling Machine Runs at 500 to 10,000 rpm

WITH the Universal-Automatic, single spindle, vertical drilling machine, you can handle a variety of work such as second operation drilling, tapping, countersinking, facing,



THE TONY ACCETTA "PET" SPOON, made of Revere Brass Strip has been awarded the Medal of Honor by Sportsman's Club of America for superiority of design and fish-getting ability while all Tony Accetta Baits have received National Sportsman's Research Award . . . a real tribute to design, construction and effectiveness.

Revere helps "fit the metal to the job"

AND A BAIT MAKER SAVES ON FORMING AND FINISHING COSTS WHILE PRODUCING AWARD-WINNING LURES

The fishing lures of Tony Accetta & Son, Riviera Beach, Florida, are known all over the world for their ability to catch fish. That's due to design. They are also known for their fine workmanship and ability to take a hammering on rocky reefs and shoals, and still retain their ability to attract fish. That's due to the material from which they are made . . . a Revere Brass with special grain size and finish.

Says the Senior Accetta, "The high quality of Revere Brass has, without a doubt, contributed immeasurably to the quality of our lures. In fact, Revere Brass is of such fine quality and finish, uniform grain size and structure that even after stamping and forming only a minimum of work is required prior to chromium plating. This means we save on both forming and finishing costs. Since we have been using Revere Brass we have not had a single customer complain due to poor quality material."

Why not put the extensive knowledge of Revere's sales representatives to work for you? With the wide variety of metals at their disposal, perhaps they can help you select the metal best suited for the job, with a resultant saving of money while improving product quality.

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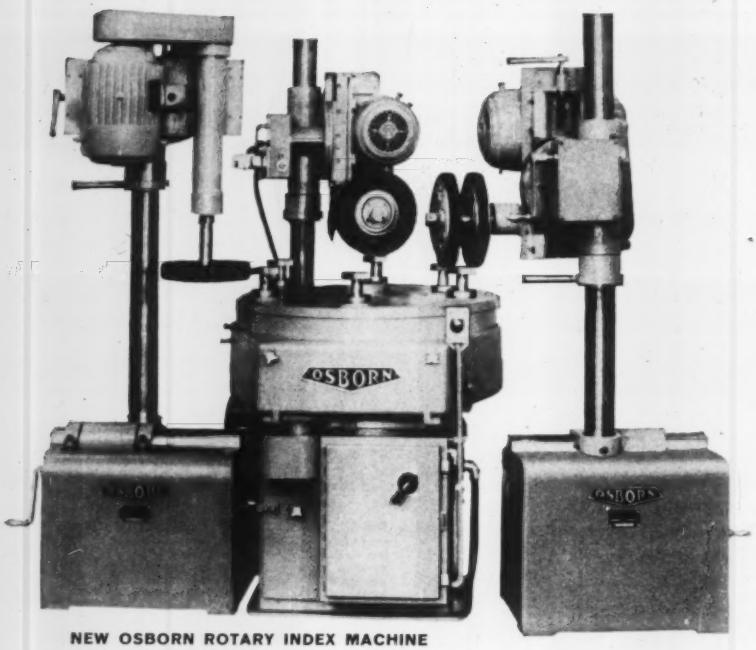
Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Fort Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

To cut your metal finishing costs . . .

NEW—
OSBORN ROTARY INDEX MACHINE



NEW OSBORN ROTARY INDEX MACHINE
Units can range from manual to fully automatic operation

Unique "building block" design means unlimited production flexibility

NEWEST ADDITION to Osborn's broad line of metal finishing machines are these Rotary Index units. Capability: significant increase of your production capacity.

Most important feature—production men can economically "build" *custom* metal finishing machines from *basic "building block"* components . . . finishing heads, index tables and electric controls. Other advanced design and construction features make these new Osborn Metal Finishing Machine units worth your immediate investigation.

Your Osborn field specialist has latest application data on a wide range of cost-saving finishing methods. And an Osborn Analysis—made in your plant—is the first step to pinpoint savings on *your* operations. Write for details. *The Osborn Manufacturing Company, Dept. S-16, Cleveland 14, Ohio.*

THE OSBORN MANUFACTURING COMPANY

METAL FINISHING MACHINES . . . AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES
FOUNDRY PRODUCTION MACHINERY

OSBORN®

NEW PRODUCTS and equipment

and reaming. Capacity includes 0.020 to 3/8 in. drilling in mild steel and up to 3/8 in. tapping and 1/2 in. threading.

A 3/4 hp spindle motor and drive pulleys provide a normal speed range between 500 and 10,000 rpm. Infinitely variable cycle control ranges up to 500 strokes a minute. Operation speed is determined by the work being done. Less than 5 psi of air pressure will maintain spindle operation.

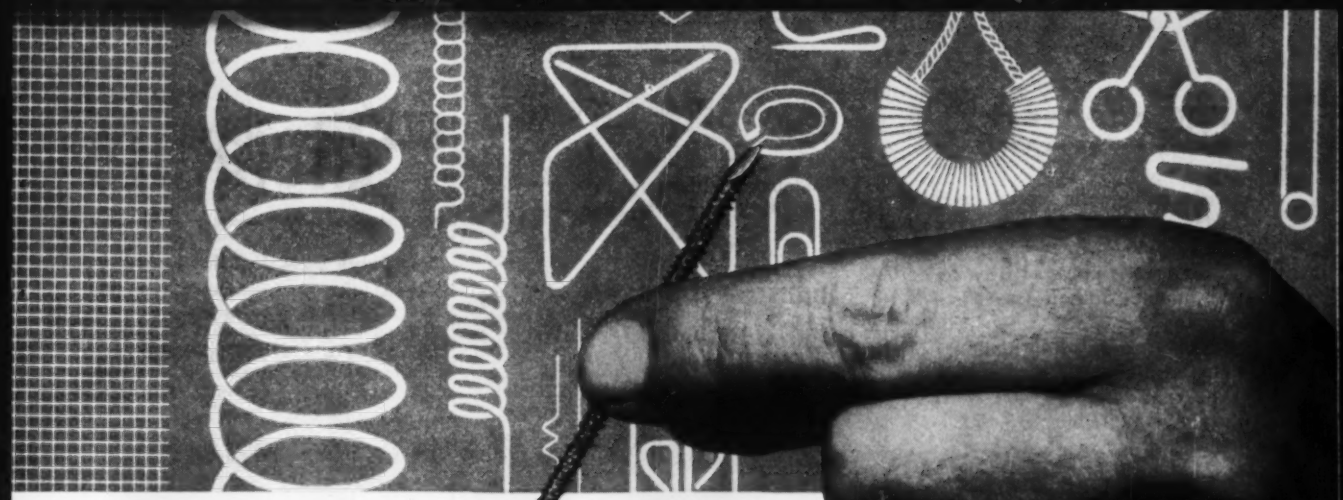
Maximum distance from spindle nose to table work surface is 24 in. Clearance between center line of spindles and columns is 8 1/2 in. Table work surface is 18 x 18 in. with chip room and oil return trough.

For further information, *write* Universal-Automatic Corp., 9545 Ainslie St., Schiller Park, Ill.

Versatile Drill Presses Available in 40 Models

A LINE of versatile 15 in. drill presses comes in 40 models. You can get them with high or slow speed, single or multiple spindle, No. 2 Morse taper or 0-1/2 in. key chuck spindle, standard or production table. Components may be obtained for making up special purpose equipment.

Slow and high speed models have a range of 470 to 4600 rpm with a choice of four speeds in each model. A multispeed attachment permits



this is a Nail!

It's a special kind of nail, knurled for greater holding ability and produced by machines which not only make nails, but at the same time drive and countersink them in leather or wood at rates up to three per second.

The wire used by these nailing machines must meet critical specifications. It must be ductile enough to form a perfect head and clinch when needed, yet be hard enough to penetrate tough grains and knots. Moreover, it must be consistent in quality throughout its length.

For 26 years, PAGE has supplied wire which meets exactly the requirements of the manufacturer of these machines—The Auto-Soler Company, Atlanta, Georgia.

Regardless of *your* use of wire, you can count on PAGE uniformity. Whether you make hairpins or lock washers, PAGE wire will give you the tensile strength, ductility, finish, toleran e and other properties you require.

PAGE facilities are designed to produce a wide range of high quality manufacturers wire items—including special shapes. Where requirements are exacting, you will find PAGE wire unexcelled.

Since 1902, we have pioneered many "firsts" in the wire industry. The latest of these is corrosion-resistant ACCO *Aluminized* Wire—commercially pure aluminum bonded to a steel core.

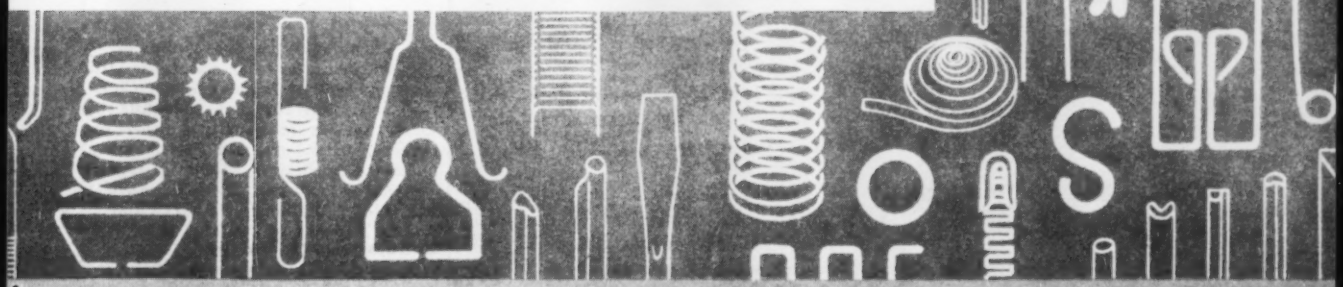
LET'S TALK WIRE! Get in touch with us for your wire needs. Gain the benefit of PAGE experience and "wire know-how" to improve your product and lower your costs.

ACCO

PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.



PAGE *—the source for answers to wire problems*

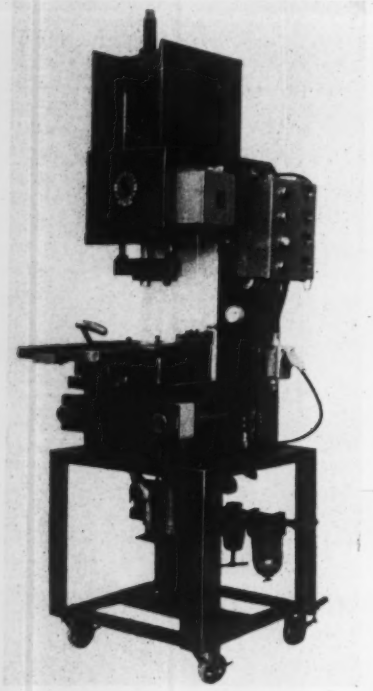
wider ranges for special operations, such as reaming at slow speeds and small hole drilling at high speeds. Each unit is powered by a 1/3 or 1/2 hp motor. Spindle travel is 4 5/16 in.

For further information, *write* Dept. 1010, Walker-Turner Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Presses Have Capacities From 1½ to 10 Tons

YOU can use Studebaker presses for high speed, precision applications. They're capable of ram cycle speeds up to 2500 an hour. The units are equipped with two hand safety controls wired for either momentary contact (through timer control for positive stroke cycle) or manual control.

The positive mechanical ram downstop control operates independently of oil or electrical circuits and is adjustable to close tolerance.

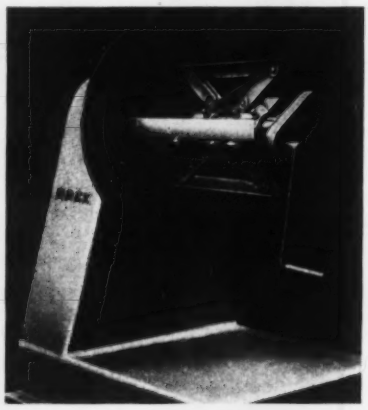


Daylight between ram and bottom plate is 16 in., throat depth is 8 in., and ram stroke is 8 in. Standard models are available in 1½, 2½, 5, and 10 ton capacities at 80 psi air supply.

For further information, *write* Studebaker Hydraulic Products Co., 1733 N. 33rd St., Melrose Park, Ill.

Industrial Decoilers Can Handle 10,000 lb

INDUSTRIAL decoilers can handle coils of steel and other materials weighing up to 10,000 lb. With expanding mandrels, they can accept material widths up to 30 in. Most models are electric powered. You can get optional equipment such as shears, cutoff line, and run-out tables.



For further information, *write* Elkhart Welding & Boiler Works Inc., 2132 S. Main St., Elkhart, Ind.

Coiler Can Roll and Flange in One Operation

THE Curvit C-155 Coiler with a flanging attachment rolls 5/16 to 5/8 in. flanges in 30 in. OD stainless rings at a rate of 90 per hour. It can also be set up to roll and flange in one operation.

The company says the line will coil pipe, tubing, wire, strap flat stock, and solid bar stock up to 2½ in. OD.

Coiling diameters are infinitely variable and controlled by one adjustment. The drive die roller is reduction gear driven by a 5 hp electric brake motor.

For further information, *write* Curvit Div., Maclodyne Corp., 19 Grosvenor Ave., East Providence, R. I.

NEW literature

Write directly to the company for a copy

Belt Drive Specifications

In addition to specifications on gear belts and pulleys, Catalog GB-201-A contains design and installation suggestions, engineering data and examples, and combinations already worked out for convenient selection. Browning Mfg. Co., Maysville, Ky.

Blast Cleaning Abrasives

Selection of steel blast cleaning abrasives and metallurgical developments applied in the production of steel shot are described in booklet No. 2294. Photographs show how poor quality shot can prove costly. Pangborn Corp., Hagerstown, Md.

Superalloy Data

Two new technical bulletins describe performance data on vacuum induction melted Waspaloy and M-252 superalloys. Each 8 page bulletin includes alloy description and chemical composition, physical constants, tables and charts on mechanical properties, isostress curves, and information on heat treating and finishing. Dept. 16, Metals Div., Kelsey-Hayes Co., New Hartford, N. Y.

Aluminum Welding, Brazing

"All-State Aluminum Charts" discusses the welding, brazing, and soldering of aluminum. Psi tensile strength, recommended joining material, percentage of elongation, and typical uses are shown for 24 alloys. Tables also show such things as compositions, melt and flow temperatures of typical aluminums, and recommended filler materials for Tig and Mig welding. All-State Welding Alloys Co. Inc., 249-55 Ferris Ave., White Plains, N. Y.

Lithium Data

An eight page technical bulletin (101) gives a complete physical and chemical description of lithium. It also describes in detail its application in combination with 17 other metals. Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.

Sales and Use Taxes

A bulletin describes the application of sales and use taxes in all the states. Data were gathered by Ernst & Ernst, Cleveland accounting firm. A table lists, by states, the tax rates, tells whether the buyer or seller pays, and cites pertinent qualifying conditions. Machinery Dealers National Association, 1346 Connecticut Ave. N.W., Washington 6, D.C.

Loading Dock Design

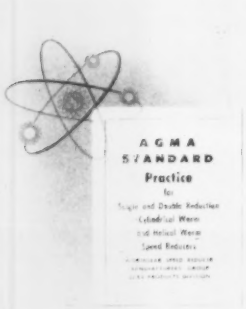
Minimum design standards and efficiency ideas to speed the movement of trucks at loading docks are the subjects of an information kit. An eight page booklet compiles data from many industry associations. Kelley Co. Inc., Milwaukee 9, Wis.

UNITED ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pa.

DE LAVAL offers new A.G.M.A. Gear Standards Booklet for Engineers

You will not want to be without this newly published American Gear Manufacturers Association booklet. It outlines the new standards for single and double reduction cylindrical worm and helical worm speed reducers.



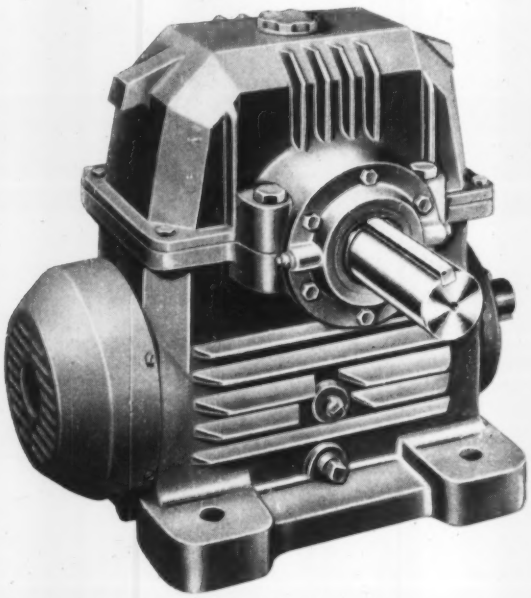
Get this new A.G.M.A. 440.03 booklet
free of charge by request
on your company letterhead.

This new standards booklet contains important design data including: Power rating of worm gears • Ratio correction factor (Km) • Materials factors (Ks) • Velocity factor (Kv) • Coefficient of friction (μ) • Thermal factor • Service factors • Efficiency • Overhung load capacity • Lubrication.

The materials factor (Ks) and the coefficient of friction (μ) are new, reflecting the latest advances made in worm gearing in the past few years.

We have also recently published our new Delroyd Worm Gear Sets Catalog 3800 and Delroyd Single Reduction Worm Gear Catalog 3805, which contain comprehensive information on the selection of these units.

De Laval furnishes worm gearing under the trade name DELROYD and has a complete line from $1\frac{1}{8}$" to 36" center distance, in horsepower ranges from .04 to 700 and in ratios from 5: to 4900:.



DE LAVAL *Steam Turbine Company*

860 NOTTINGHAM WAY, TRENTON 2, NEW JERSEY

DL 482

Users Struggle to Build Stocks

FEARING another strike when the injunction expires, steel users are redoubling their efforts to get as much metal as they can before the Jan. 26 deadline.

"They're coming at us from all directions—trying to get more than we can offer," a major producer reports. It's the same story for every steelmaker, despite record breaking ingot production and better shipments than anyone had a right to expect.

Since flat rolled products are in tightest supply, most of the pressure is coming from automakers, appliance manufacturers, can companies, shipping container fabricators, and makers of office furniture and equipment.

QUOTAS ESTABLISHED—Barring resumption of the strike, cold rolled sheet producers expect to clean up all back orders by the end of February. They've allocated their tonnage for the first half and told each customer what his allocation is. Customers of long standing can expect to get about as much tonnage per month as they bought on the average in good times and bad prior to the strike. Some will, of course, be disappointed. Reason: In 1958, steelmakers had to solicit new business to keep their mills running, and they did so with the promise that they would provide shipments on a continuing basis. Now they must make some tonnage available to new accounts at the expense of some better established customers who allowed their purchases to slip badly during the recession.

HAND TO MOUTH—Even though industry shipments will exceed consumption by about 2 million tons this month, it's clear that users won't be able to increase their inventories significantly. Instead of having their traditional 30 day stocks, automakers are running on 15 to 21 day supplies. If the strike were resumed, General Motors would probably have to start closing its assembly plants within three weeks.

OUTPUT LEVELS OFF—Last week, steelmaking operations held at 96.5 per cent of capacity, unchanged from the previous week's revised rate. Production was about 2,732,000 ingot tons. Operations may dip somewhat this week and next because of the holidays, but it's almost certain that December output will set an all-time monthly record (nearly 12 million tons).

WILL TOP 93 MILLION—Last month's production (7.62 million tons) surpassed expectations by about 400,000 tons—largely because steelmakers' weekly forecasts underestimated the speed of poststrike recovery. Since the 11 month total was 81.4 million tons, it's apparent that this year's output will be about 93.4 million. In spite of a 116 day strike, longest by far in the industry's history, production will exceed last year's by about 8 million tons.

BETTER DAYS AHEAD—If sales predictions of leading steel consumers are borne out, 1960 will be a banner year for metalworking. Automakers expect to build 6.7 million cars, 22 per cent more than they'll assemble this year and second only to the 7.9 million produced in 1955. Electrical appliance manufacturers expect retail sales to reach an all-time high, with dollar volume about 5 per cent ahead of this year's. Farm implement production may not be as strong in 1960 as it was this year, but the level is expected to remain high.

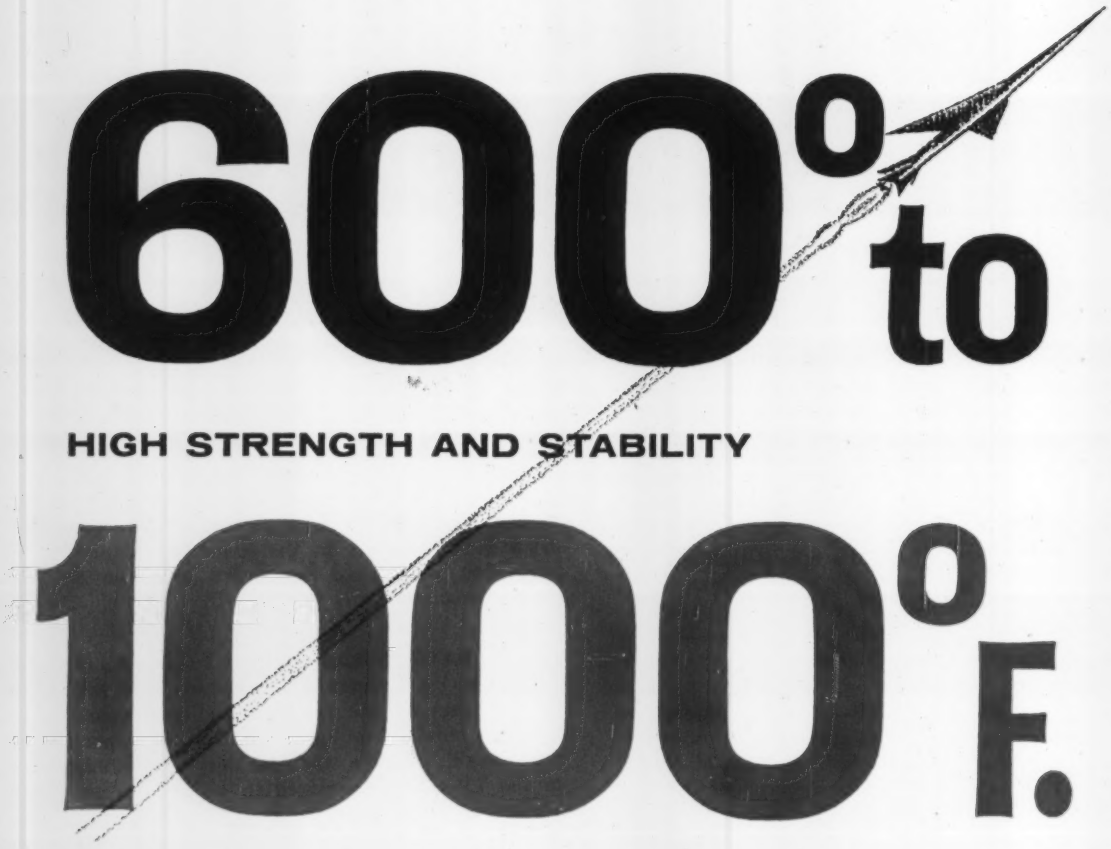
WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	116	123
Reinforcing	...	124
Boiler Tubes	...	126
Canada	...	*
Clad Steel	...	127
Coke	...	129
Coal Chemicals	119	129
Charts:		
Finished Steel	...	121
Ingot Rate	120	...
Scrap Prices	...	133
Comparisons	...	121
Contracts Placed	133	...
Contracts Pend.	139	...
Electrodes	...	129
Fasteners	...	126
Ferroalloys	117	130
Fluorspar	...	129
Footnotes	...	126
Imported Steel	115	129
Ingot Rates	120	...
Metal Powder	...	129
Nonferrous Met.	136	138

	News	Prices
Ores	119	129
Pig Iron	119	128
Piling	...	123
Plates	115	123
Plating Material	...	139
Prestressed Strand	...	*
Price Indexes	...	121
Producers' Key	124	...
R.R. Materials	...	126
Refractories	...	129
Scrap	132	134
Semifinished	...	123
Service Centers	119	128
Sheets	114	124
Silicon Steel	...	125
Stainless Steel	...	127
Strip	114	125
Structurals	133	123
Tin Mill Prod.	119	125
Tool Steel	...	127
Tubular Goods	116	127
Wire	115	125

*Current prices were published in the Dec. 14 issue and will appear in subsequent issues.

Metalworking Outlook—Page 41 Technical Outlook—Page 85



WITH GOOD FABRICATION PROPERTIES

AM 350 and AM 355 are metals for the space age! The combination of easy fabrication with high strength-to-weight ratio of AM 350 and AM 355 interests missile and supersonic aircraft designers with problems of high strength at elevated temperatures.

This pair of precipitation hardening stainless steels from Allegheny Ludlum research are easy to fabricate in the annealed condition. They can be spun, drawn, formed, machined, brazed and welded using normal stainless procedures.

Both alloys have high strength without embrittlement from room temperature to 1000°F, plus good ductility at elevated temperatures. They have remarkable stability and excellent corrosion resistance.

AM 350 is available in sheet, strip, foil, small bars and wire. AM 355, best suited for heavier sections, is available in forgings, forging billets, plates, bars, wire, sheet and strip.

For further information, see your A-L sales engineer or write for the new technical booklet, "AM 350 and AM 355," **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.**

822

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

Galvanizers Set for Record 1960

YOU CAN EXPECT record shipments of galvanized sheets during 1960—assuming there's no work stoppage in steel next month. The movement of other galvanized products (pipe and wire) will also be at a high level. Depleted inventories and high consumption promise near-capacity galvanizing operations through most of the year.

Marketmen estimate mill shipments of galvanized sheets (the bellwether product) will hit 3.7 million net tons, topping the record (2,957,657 net tons, set in 1956) by a wide margin. This year, despite the heavy strike loss, an estimated 2,674,000 tons were moved, only about 154,000 fewer than were shipped in recession-troubled 1958 (see table).

• Shortages of galvanized sheets will probably continue long after the steel labor dispute has been settled.

That's because the mills, the warehouses, and manufacturers virtually exhausted their inventories during the 116 day strike and won't be able to replenish them for many months. The poststrike rise in galvanized sheet shipments has been slower than that of other flat rolled products because of the multiplicity of operations required in their production.

Even before the work stoppage curtailed production, a scarcity market existed. It was partly attributable to the heavy consumption arising from the tremendous grain storage bin programs of the government in recent years. At the same time though, it reflected steadily mounting requirements in general fabrication and construction.

Shipments have climbed 72 per cent in the last decade, Leslie Irvine, assistant vice president, Wheeling Steel Corp., pointed out recently. They rose 18 per cent in 1958 (vs. 1957), to account for 4.7 per cent of all steel shipments. Were it not for the work stoppage, the 1959 total would have been record breaking.

• Producing capacity has been steadily enlarged but still falls short of meeting anticipated demands.

The experts say galvanized sheets are becoming so popular in many applications the nation will need 4.3 million tons annually by 1962, and probably 4.7 million tons by 1967. Additional capacity will be needed to keep up with the expanding requirements in virtually all areas of use.

Hot dipped galvanized sheets are normally produced by two different processes: 1. The cut length process, consisting of coating cut sheets by passing them through a bath of zinc. 2. The continuous process, consisting of uncoiling and passing a continuous length of successive coils through the zinc bath, following which the continuous sheet may be either recoiled or sheared to cut lengths.

The continuous process is the principal method used. In fact,

Shipments of Galvanized Sheets

(Net tons)

MARKETS:	1960**	1959*	1956
Contractors' Products	1,365,000	971,250	965,222
Warehouses	1,170,000	832,500	953,995
Agricultural	253,500	180,375	180,057
Automotive	204,750	145,687	89,057
Construction	195,000	138,750	187,789
Appliances	165,750	117,937	125,139
Other Domestic Equipment	96,525	68,681	64,678
Electrical Machinery	63,375	45,093	55,228
Exports	63,375	45,093	157,925
Containers	62,300	44,400	54,112
Machinery	46,800	33,300	37,573
Railroad	39,000	27,750	49,699
Processing	19,500	13,875	24,989
Shipbuilding	8,482	6,035	6,116
Aircraft	1,560	1,110	1,754
Fasteners	1,072	763	445
Mining, Lumbering, etc.	1,072	763	834
Ordnance	770	548	3,011
Oil & Gas	243	173	459
Totals	3,758,074	2,674,083	2,957,991

*Estimated on basis of the percentage of shipments pattern in the first six months.
**Indicated on the basis of the shipment pattern in the first six months of 1959.

Consumption of Slab Zinc In U. S.

(Net tons)

	1959*	1958
Total	644,013	868,327
All Galvanizing	256,011	381,229
Sheets and strip	133,546	194,196
Tubes	44,637	67,318
Wire	23,367	35,638
Other	54,461	84,077

*Eight months.

some authorities say the development of the continuous lines brought galvanized sheets within the rigid limitations of an acceptable product in many applications—and did so at a much lower production cost.

• There are more than 30 continuous lines with an estimated combined capacity of 3 million net tons.

Additional lines are being built and still more are projected for early construction. They will add substantial galvanizing capacity within the next year or so. But the steady growth in use will necessitate additional installations over the next decade if the industry is to keep step with the nation's needs.

Galvanized, corrugated sheets have been used for decades as roofing and siding in industrial and farm structures. The combination of structural strength and corrosion resistance which they afford has made them popular in solving many construction problems. Recently, the steel industry developed a superior quality galvanized sheet that's available in standard sizes and grades to meet specific service requirements.

• Construction provides the main outlet for galvanized sheets, particularly in the fabrication of contractors' products.

But galvanized sheets are used in virtually all channels of consumption (see table, top of Page 113). Some important outlets (in addition to construction) are: Warehouses, agriculture, automotive, and appliances. Exports accounted for 45,093 tons in 1959, off sharply from the 86,432 tons reported for 1958.

Galvanized steel products accounted for 40 per cent of total zinc consumption in the first eight months of 1959. That compares with 43 per cent in all of 1958 and 46 per cent in 1950. Galvanized sheets alone took 52 per cent of the galvanizing total in the first eight months of 1959 and 51 per cent in all of 1958.

Total consumption of zinc in galvanizing in the first eight months of 1959 was 256,011 tons, of which 133,546 tons were used in producing galvanized sheets and strip, 44,637 tons were used in producing tubing and pipe, 23,367 tons in galvanized wire, and 54,461 tons in other galvanized steel products (see table, bottom of Page 113).

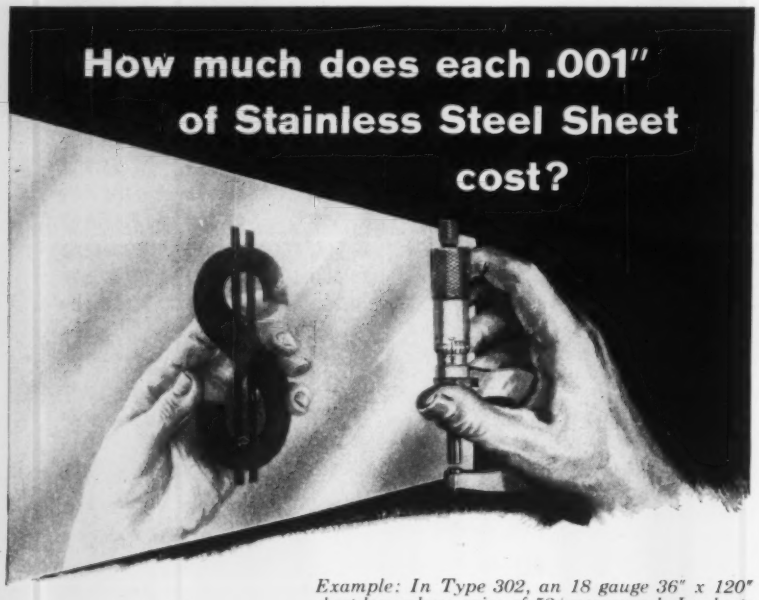
Sheets, Strip . . .

Sheet & Strip Prices, Pages 124 & 125

Producers of hot and cold rolled and galvanized sheets are still leaving a little space open in their schedules for tonnage to be rolled in late second quarter, but they could easily book business into the third quarter if they were so disposed. Actually, a fairly substantial inquiry is developing for that position.

Sheet specialties are in strong demand, but some tonnage is available for April shipment in electrical sheets and enameling stock.

Inquiry for the tonnage classifications is especially strong from the automotive industry, manufacturers of household appliances, shipping containers, and manufacturers of office furniture and equipment.



Example: In Type 302, an 18 gauge 36" x 120" sheet has a base price of 52¢ per pound. In sheets of this size, each .001" of thickness weighs 1.26 pounds per sheet. Thus, each .001" of unnecessary thickness costs you at least 65.5¢ more per sheet.

On the surface this may seem insignificant, but it has a marked effect on the total price you pay for a given quantity of stainless steel sheet. With cost a factor, this can be important since stainless steel is purchased by weight.

Using the above example, a mere .001" of unnecessary thickness costs you $20.76 more per ton. If you figure the maximum allowable gauge thickness variation of plus or minus (10%), you can readily see that the price you pay for overall sheet thickness could involve much needless cost.

Washington Steel has the equipment and the experience to produce MICRO-ROLD stainless steel to tolerances much closer than standard industry tolerances. Usually money can be saved by first selecting the minimum gauge that will serve the requirements of the application, and then specifying that the thickness be rolled to the light side of the gauge range. This specification involves no cost extra and is standard practice at Washington Steel. (If exact close tolerances must be guaranteed, there is a nominal additional charge.)

Consult your nearest MicroRold Stainless Steel Distributor. He will gladly show you how to save money on your stainless steel purchases.

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The auto companies are getting in new sheet tonnage in volume, enabling them to resume peak manufacturing faster than had been anticipated. So far, however, they have been unable to add to reserve stocks to any extent.

Because of the shortage of steel at some auto plants, partmakers are still adversely affected by held up orders.

Some Import Steel Prices Rise but Others Decline

Prices on some steel products imported from western continental Europe are rising, strength stemming partly from the continued impasse in negotiations for a new labor agreement in the American steel industry. However, easier demand for some other products is being manifested in lower prices on bar size angles, merchant bars, hot rolled bands, and nails. Deliveries of some of the items can be had in late February and early March.

Sheets are particularly strong, with cold rolled (despite some adjustments) quoted higher than galvanized sheets. Cold rolled and galvanized deliveries extend into May and June. Shipments of hot rolled are only a little less extended.

European steel is in strong demand all over the world, partially at the expense of American steel. However, with European deliveries far extended and the American labor deadlock certain to be broken before too long, current buying of imported sheets in this country is off, though still active.

Prices on products for shipment to Great Lakes ports are expected to be set up by importers when deliveries extend beyond the probable opening of the 1960 lake navigation season.

Wire . . .

Wire Prices, Pages 125 & 126

Bookings by producers of wire rods and manufacturers wire are reported so heavy that deliveries are extended four months or so. Shipment promises on nails are becoming more extended, presently being around three months. Other merchant wire products, however, are in relatively easy supply at most production points. This situation should stiffen within another month under seasonal influences.

Plates . . .

Plate Prices, Page 123

Assuming there's no interruption of production over coming months, sheared plates are available for delivery to consumers via regular sources of supply within three to four months.

Producers could book themselves solidly into May if they were disposed to take all the tonnage offered them. However, pressure for plates is not quite as strong as is that for sheets and bars.

Sellers of universal plates report brisk inquiry from structural fabricators and railroad carbuilders. Alloy plates are in good demand for chemical equipment needs and special government work.

Naval shipyard contracts and inquiries for plates in December for first quarter (1960) shipment totaled around 15,000 tons. Priority under the Defense Production Act can be applied on this tonnage. The Business & Defense Services Administration has issued a basic regulation requiring contractors and sup-

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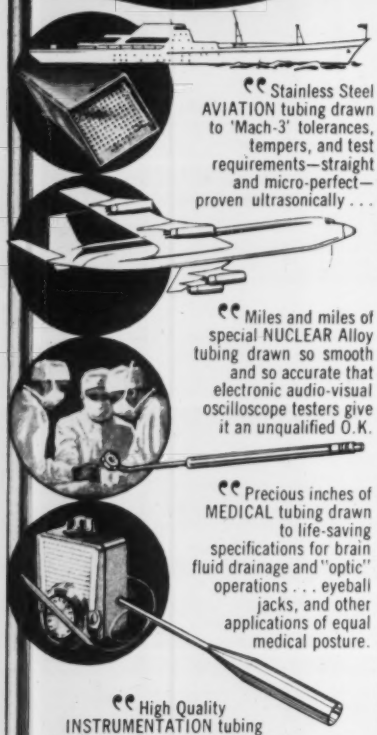

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pliers to employ priority when placing purchase orders for materials needed to meet delivery schedules on defense work.

Steel Bars . . .

Bar Prices, Page 123

Producers of hot rolled carbon steel bars are booked heavily into May and beyond. Some bookings are on the basis of detailed specifications, being more than just set-aside tonnages. The heavier bar sizes are in principal demand, which always seems to be the case in a period of tight supply.

Cold drawn carbon bars are difficult to obtain against new orders before the end of the first quarter. Much tonnage now being shipped is against orders originally placed last spring for July-August-September shipment. Rising receipts of hot bars will be reflected soon in improved cold bar shipments.

Tubular Goods . . .

Tubular Goods Prices, Page 127

Oil country goods producers expect to be current on casing and drill pipe orders by February and up to date on tubing deliveries by March at latest.

Some users are apprehensive about possible shortages next year. A major oil company recently inquired whether it could get all of its first quarter tonnage delivered by the end of March if it ordered now. It had booked nothing previously.

"All we could tell him was that we would do our best," a sales executive commented. "He was already shut out for January on casing and for February on tubing."

On trunkline pipe a leading producer is sold out through the first quarter. Demand for large diameter (14 to 24 in.) standard pipe is sluggish. Producers say they'll be current with demand next month.

Biggest delays are in the smaller sizes of seamless, particularly the 2 to 4 in. Reason: Oil country goods are made on the same mills. September and October tonnage won't be shipped until January and February. Orders that were originally scheduled for February won't be shipped until April.

Rotary drilling operations turned downward in the midst of what seemed to be a yearend rally. The Hughes Tool Co.'s survey for the

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week ended Dec. 7 showed 2176 rigs at work vs. 2213 on Nov. 30. The decline snapped a four-week advance.

Ohio Ferro-Alloys Raises Some Ferrochrome Prices

Increased prices and new analysis specifications on charge grade ferrochrome alloys, effective Jan. 1, 1960, have been announced by Ohio Ferro-Alloys Corp., Canton, Ohio.

Other producers haven't yet announced policy, but it's expected they'll take similar action. Prices on other chromium alloys will remain unchanged.

The adjustment reflects a new appraisal of current production costs. The new prices are generally the same as those prevailing in October, 1957, which were about 2 to 4 cents higher than those presently quoted. However, there has been an analysis revision since then.

Nomenclature and analyses of charge chrome will be standardized as charge chrome, blocking chrome, and refined charge chrome. Each grade will be available as No. 1 and No. 2 alloy on the chromium content specified by the consumer. New grade and base prices per pound of contained chromium are:

Charge chrome (5 to 8 per cent carbon, 4 to 7 per cent silicon) No. 1 grade (53-55 per cent chromium) 25 cents; No. 2 grade (61-65 per cent chromium) 26 cents.

Blocking chrome (6 per cent max carbon-8 to 12 per cent silicon), No. 1 grade (50-55 per cent chromium) 26 cents; No. 2 grade (58-63 per cent chromium) 27 cents.

Refined charge chrome (5 per cent max carbon-2.5 per cent max silicon), No. 1 grade (50 to 55 per cent chromium) 27.50 cents; No. 2 grade (58-64 per cent chromium) 28.50 cents.

Ferroalloys . . .

Ferroalloy Prices, Page 130

Consumption of ferromanganese in the first six months of this year totaled 495,286 net tons, of which 295,736 tons were high carbon, and 35,550 tons medium and low carbon, reports the U. S. Bureau of Mines. Silicomanganese consumption in the period was 55,450 tons, spiegeleisen, 16,098 tons, and man-

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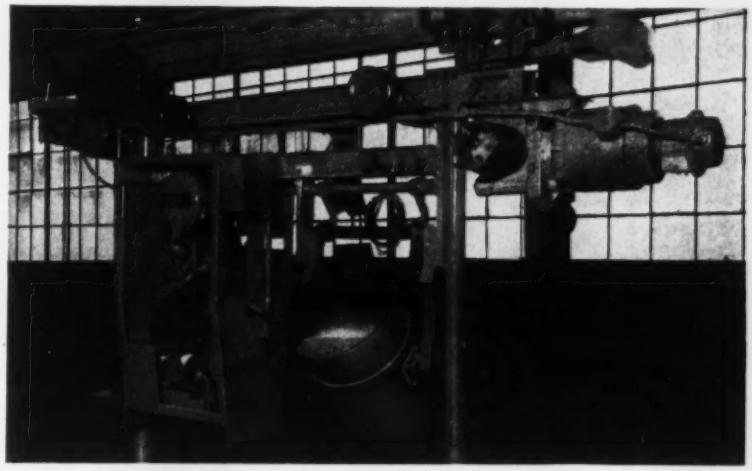

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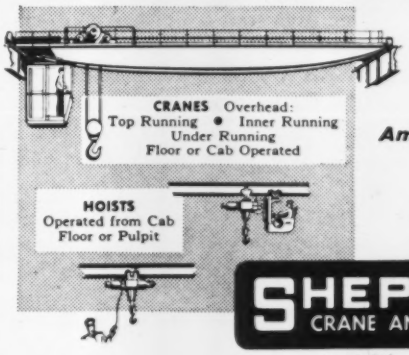

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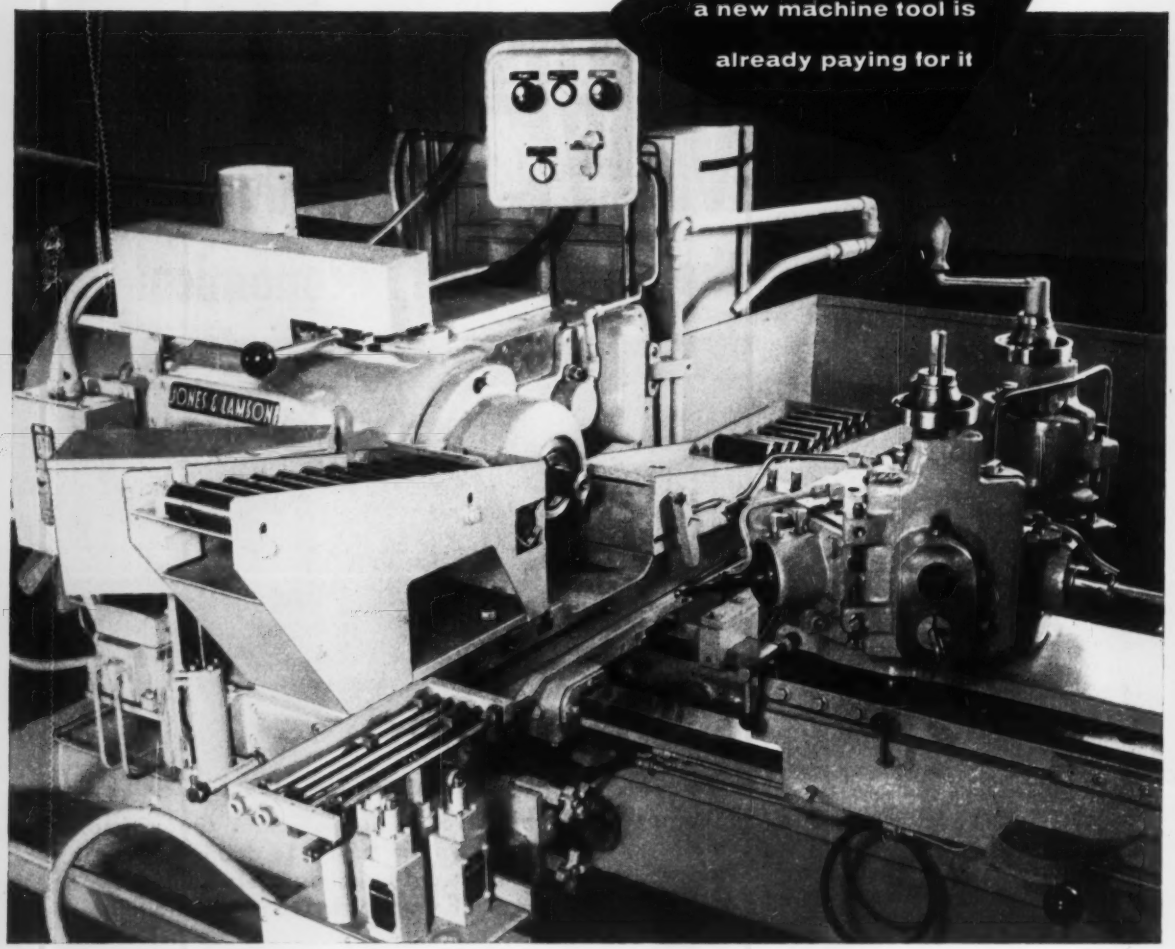

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ganese metal 6921 tons.

The steel castings industry consumed in the period: 12,008 tons of high carbon and 1777 tons of medium and low carbon manganese; 5380 tons of silicomanganese; 667 tons of spiegeleisen; 93 tons of briquets, and 93 tons of manganese metal.

Consumed in all other uses: 13,866 tons of ferromanganese; 719 tons of silicomanganese; 5595 tons of spiegeleisen; 3527 tons of briquets; 1372 tons of manganese metal.

Stocks of ferromanganese at the end of June were 119,562 tons; silicomanganese, 12,592 tons; spiegeleisen, 39,146 tons; briquets, 1314 tons; manganese metal, 1495 tons.

Iron Ore . . .

Iron Ore Prices, Page 129

When lake shipping resumed early in November, following the Taft-Hartley injunction, vessel operators hoped to bring down at least 10 million additional tons of ore before weather forced the fleet to tie up for the winter. It now looks as though the shippers will fall short of the mark by about 1.7 million tons; the poststrike total probably won't exceed 8,250,000 gross tons.

Shipments for the 1959 navigation season are expected to amount to around 46.5 million gross tons, 6.3 million tons less than the 52.8 million tons brought down the lake route during recession - troubled 1958.

Pig Iron . . .

Pig Iron Prices, Page 128

Foundry demand for merchant pig iron has eased due in part to seasonal factors. Some plants will close from Christmas through Jan. 4. Even after the turn of the year, demand will not be pressing since supplies will be ample and there will be no necessity for inventory buying.

Movement of merchant iron to upper lake ports in the closing weeks of the shipping season was not quite as heavy as had been anticipated. One reason for this was that many auto plants were forced by the steel shortage to curtail production.

Six lake vessel operating companies and the Great Lakes Steamship Owners Association are attacking a reduction in rail rates on pig iron from Cleveland to Chicago, recently allowed by the Interstate Commerce Commission. The ICC is named defendant in an action in the federal court at Cleveland.

The vesselmen say a $6.02 freight rate made effective Dec. 1 on the B. & O., Erie, New York Central, Nickel Plate, and Pennsylvania Railroads should not have been allowed. They claim shippers sending iron by lake vessels from Cleveland to Chicago have to pay $7.61 for all charges, including handling at both ends of the route.

Distributors . . .

Prices, Page 128

Steel service centers are gradually rebuilding their stocks, but will not have the popular items well balanced until the second quarter at the earliest. This does not apply to specialty items. One distributor in the Los Angeles district, for instance, has received six months' supply of a specialty item in just three weeks and is hard pressed to know what to do with the tonnage.

West Coast mills are delivering increasingly large tonnages, but shipments from the East are behind schedule. Normal movement is not expected for 60 days.

Some steel imports (reinforcing bars, pipe, and nails) have arrived on the West Coast, but foreign items are less noticeable in the Seattle sector than elsewhere.

Prices on galvanized sheets have been raised to the basis of 12.50 cents for primary zinc.

Tin Plate . . .

Tin Plate Prices, Page 125

Can prices will be raised slightly by the American Can Co. and Continental Can Co. following the signing of new labor contracts providing higher wages. Amounts of the increases remain to be disclosed, but American Can said its new prices will be slightly higher. The new prices will hold throughout 1960 if there are no increases in tin plate costs.

Metal can shipments in October

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dropped sharply, totaling 382,488 tons vs. 641,859 in September and 449,257 in October, 1958, reports the U. S. Census Bureau. For the first ten months shipments were higher than in the like 1958 period—4,331,852 tons vs 4,156,295.

The movement of fruit and vegetable cans in the month was 119,472 tons vs. 262,897 in September and 154,706 in October last year. The total for the first ten months was off slightly, 1,424,676 tons vs. 1,425,730 in 1958.

Shipments of beer cans were 56,508 tons in October vs. 117,768 in September, and 62,412 in October, 1958. The movement for the first ten months was 791,656 tons.

Steel Production Jumps Sharply During November

Steel ingot production totaled 7,262,000 net tons in November, reports the American Iron & Steel Institute. Output was the highest for any month since June and compares with 1,704,533 tons in October, this year, and 8,569,318 tons in November, 1958.

Production was resumed early in the month after the Taft-Hartley injunction brought a truce in the 116-day strike. Indications are December's output will top November's by a wide margin.

In the first 11 months of 1959, production totaled 81,446,159 net tons vs. 76,544,363 in the like 1958 period. During the first half of this year, output set a record at around 64.3 million tons.

The institute's index of steelmaking for November was 105.5 in terms of the basic index of average production during 1947-49. It compared with 24.0 in October, this year, and 124.5 in November, 1958. The 11-month index was 106.3 vs. 99.9 in the like period last year.

Based on the Jan. 1, 1959, capacity rating of 147,633,670 net tons, the industry operated at an average of 59.8 per cent during November vs. 13.6 per cent in October. The 11-month average was 60.3 per cent.

Steel Ingot Production—November, 1959

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1959						
January	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr.	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr.	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo.	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
†July	4,540,182	66,433	94,489	526,025	5,227,129	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September	1,249,398	.....	.....	285,619	1,535,017	12.7
3rd Qtr.	6,960,922	66,433	94,489	1,079,579	8,201,423	22.0
9 Mo.	63,522,755	1,082,256	1,448,948	6,425,667	72,479,626	65.6
*October	1,385,490	.....	.....	319,043	1,704,533	13.6
†November	6,287,000	92,000	130,000	753,000	7,262,000	59.8

Period	OPEN HEARTH— Net tons	Percentage of capacity	BESSEMER— Net tons	Percentage of capacity	ELECTRIC— Net tons	Percentage of capacity	TOTAL— Net tons	Percentage of capacity
1958								
January	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,912	56.5
February	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr.	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
May	5,602,123	53.9	110,366	32.3	588,670	48.2	6,301,159	52.7
June	6,378,942	63.4	88,125	26.6	660,413	55.8	7,127,480	61.6
2nd Qtr.	16,856,684	55.3	307,924	30.7	1,797,022	50.1	18,961,630	54.0
1st 6 Mo.	33,792,864	55.7	633,176	31.7	3,326,447	46.6	37,752,487	54.1
July	5,712,587	55.0	114,218	33.4	615,600	50.4	6,442,405	53.9
August	6,481,185	62.4	134,435	39.3	692,383	56.6	7,308,003	61.1
September	6,769,660	67.3	103,194	31.2	759,518	64.2	7,632,372	66.0
3rd Qtr.	18,963,432	61.5	351,847	34.7	2,067,501	57.0	21,382,780	60.3
9 Mo.	52,756,296	57.7	985,023	32.7	5,393,948	50.1	59,135,267	56.2
October	7,795,541	75.0	148,458	43.4	895,779	73.3	8,839,778	74.0
November	7,572,555	75.3	145,867	44.1	850,896	71.9	8,596,318	74.1
December	7,755,002	74.6	116,637	34.1	838,883	68.6	8,710,522	72.9
4th Qtr.	23,123,098	75.0	410,962	40.5	2,585,558	71.3	26,119,618	73.6
2nd 6 Mo.	42,086,530	68.3	762,809	37.6	4,653,059	64.1	47,502,398	67.0
Total	75,879,394	62.0	1,395,985	34.7	7,979,506	55.4	85,254,885	60.6

Note—The percentages are based on annual capacities as of Jan. 1, 1959: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons. In 1958, the capacity tonnages were: Open hearth, 122,321,830 net tons; bessemer, 4,027,000 net tons; oxygen process, electric, and crucible, 14,393,740 net tons. Total: 140,742,570 net tons.
*Revised. †Preliminary.

DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Dec. 20	Change	Same 1958	Week 1957
Pittsburgh	96.5	+ 1*	70	62.5
Chicago	94.5	+ 1*	85	76
Eastern	96	+ 1	72	81
Youngstown	99	0	62	63
Wheeling	95	0	85	61
Cleveland	99	+ 1.5*	73	69.5
Buffalo	105	0	66	63.5
Birmingham	86.5	0	67	71
Cincinnati	100.5	— 2*	82.5	68.5
St. Louis	105.5	— 4*	94	75.5
Detroit	98	+ 2.5*	94	81
Western	95	+ 1	79	77
National Rate	96.5	0*	74.5	68.1

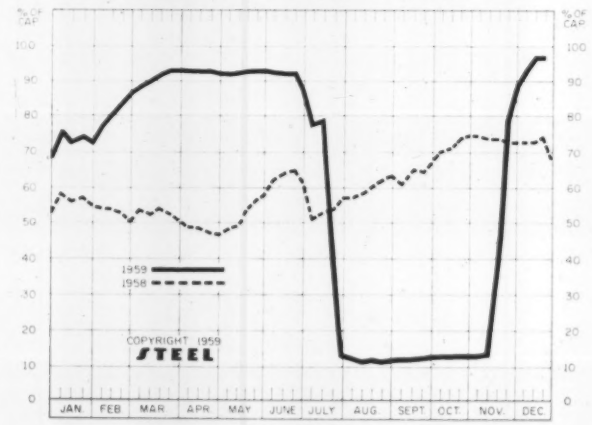
INGOT PRODUCTION

	Week Ended Dec. 20	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	170.1†	170.1	139.0	125.2
NET TONS (In thousands)	2,732†	2,732	2,233	2,011

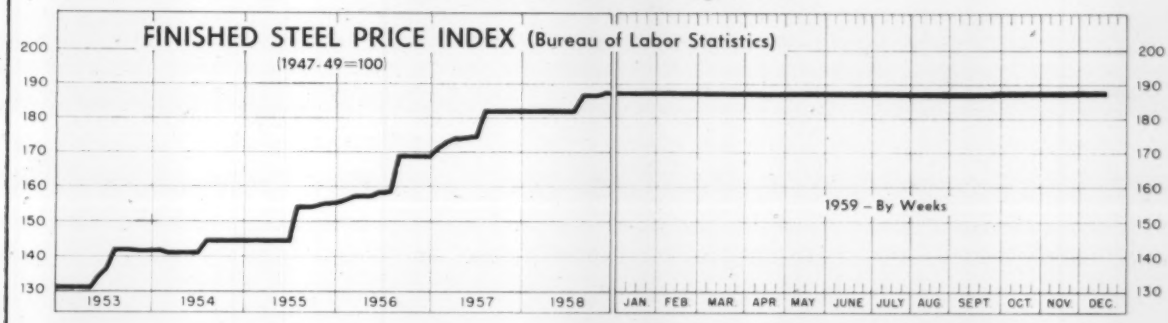
*Change from preceding week's revised rate. †Estimated by STEEL; comparative figures reported by AISI.

Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Dec. 15, 1959	Week Ago	Month Ago	Nov. Index	Year Ago
186.8	186.8	186.8	186.8	186.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.758
		Woven Wire Fence (20-rod roll)	21.793

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 16 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.95
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	41.33	42.83	44.83	39.17	32.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Dec. 16 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, 1/2-5/8" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	Dec. 16 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

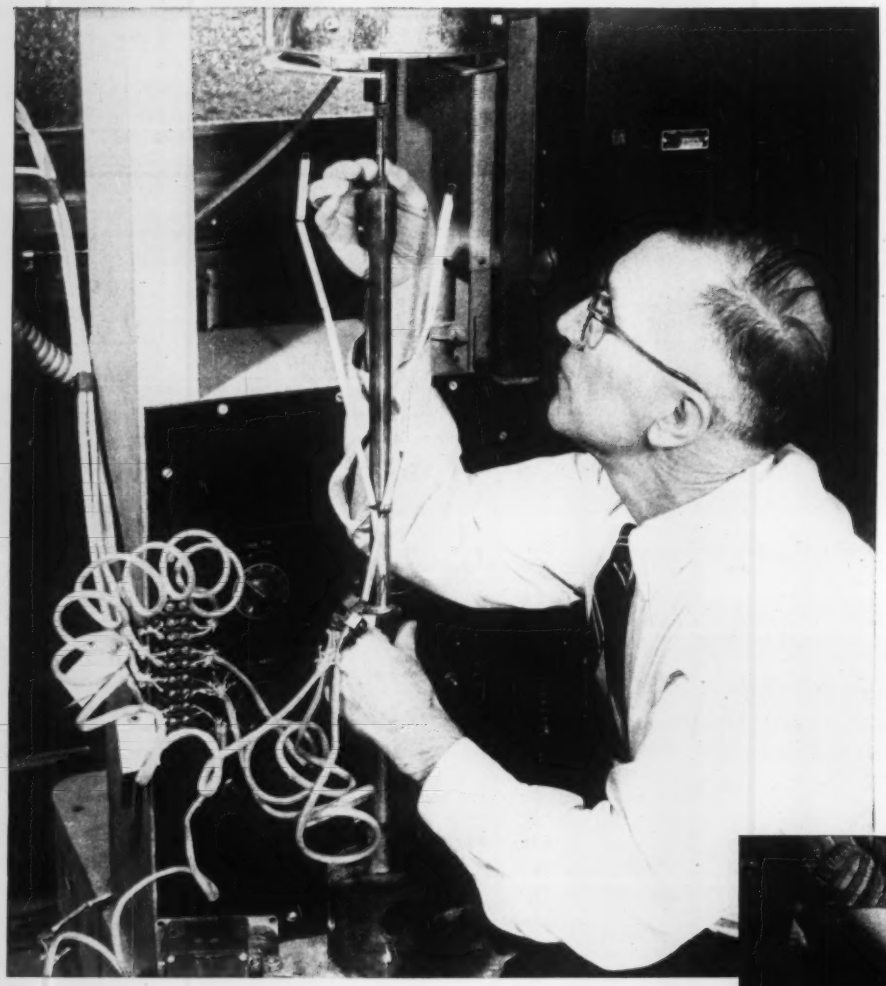
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$41.50	$41.50	$45.50	$41.50	$32.50
No. 1 Heavy Melt, E. Pa.	42.00	45.00	45.00	34.00	31.75
No. 1 Heavy Melt, Chicago	40.50	42.00	44.00	42.00	33.00
No. 1 Heavy Melt, Valley	43.50	43.50	45.50	42.50	34.50
No. 1 Heavy Melt, Cleve.	40.50	40.50	42.50	39.00	32.50
No. 1 Heavy Melt, Buffalo	37.50	33.50	39.50	33.50	30.50
Rails, Rerolling, Chicago	61.50	61.50	64.50	62.50	52.50
No. 1 Cast, Chicago	54.50	54.50	57.50	45.50	39.50

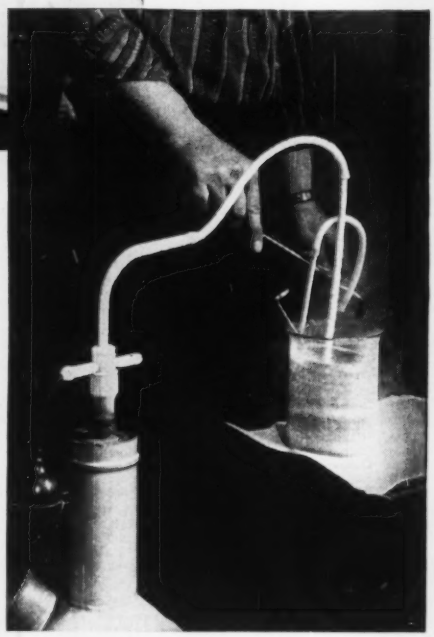
COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25



Physical tests at Standard include those for special properties of steel alloys under extreme variations in temperature. Here, the strength and ductility of steel are being checked for resistance to stress under severe conditions of elevated temperatures over a prolonged period of time.

Charpy impact and transition temperature determinations have recently assumed importance in many applications. Here a steel sample is immersed in liquid nitrogen to determine its susceptibility to fracture at temperatures as low as −300°F.



Quality control—a vital activity at Standard Steel Works

Every conceivable shop and laboratory test required for modern quality control can be performed by Standard's staff of metallurgical technicians. Testing of incoming raw materials; physical property tests of steel and other alloys at temperatures from several hundred degrees below zero up to red heat; gas analysis, ultrasonic, X ray, magnetic particle, fluorescent penetrant and microscopic examination of finished products are routine checks which assure that the finished, delivered product will meet the most rigid specifications. Write Department 2-L for full details.

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON

Steel Prices

Mill prices as reported to STEEL, Dec. 16 cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers page 124; footnotes, page 126.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ..$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 .80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ...80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva, Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren.O C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32 119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren.O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren.O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity, Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14 ..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
Los Angeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14.5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ...8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren.O. R2 .....5.30
Youngstown U5, Y1 .....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 .....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 .6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa. (9) U5 ..5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1 5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles Calif. P1 .....6.375
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11 6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle A24, B3, N14..6.425
S.Ch'c'go(9)R2,U5 W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance Calif.(9) C11 6.375
Warren,O. C17 .....6.052
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 .....6.275
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14 8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLE; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls Pa.,M12,R2 9.025
Bethlehem,Pa. B2 .....9.026
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey Ill. B5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ....11.00
Mansfield,Mass. B5....9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester Mass. A7 ...9.325
Youngstown F3 Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14..5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna, N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ...7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS,Rail Steel

ChicagoHts.(3) C2, I-2..5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Lackawanna,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O A10 *....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ....7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 .....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ...8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Middletown,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport, Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	0.80C	1.05C	1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7, J4, T6	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	**An'ld Galv. Stone**	**Galv.**
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville B8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'im'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage	**An'd Galv.**
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775§
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansCity(48) S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48) N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc price of: *13.50. †5c. $10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:

3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1¼ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:

3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cutthread) & Undersize Body (rolled thread)

½ in. and smaller:

6 in. and shorter	48.0
Larger diameters and longer lengths	35.00

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:

6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts

(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. (ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy

Hot Pressed & Cold Punched:

⅜ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS (Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0

Longer than 6 in.:

⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter +85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

7/16 in. and smaller by 6 in. and shorter: 15% off list.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....								
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.21		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+31	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.50c, East St.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; Bars; C.F. Wire	Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	101.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 Cb/Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Strip, Carbon Base —Cold Rolled— Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no change.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	10.06	....	11.45[c]	10.05[d]	11.80 #	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14 #	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.77	53.50	12.17	10.19	13.30 #	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	11.25	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58 #	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.94	52.33	10.32[c]	8.75[d]	11.25 #	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.85[c]	8.90[d]	13.10 #	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.35	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.89	52.17	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76	52.33	10.30[c]	8.64[d]	11.25 #	15.05	9.00	8.47[e]	10.26[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.80[a]	9.31[b]	10.47	....	10.32[c]	8.70[d]	11.49 #	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
Southington, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [c]⅛ x 1 in.; [d]¾-2⅛ in.; [e]¼ x 84 in.; [f]¼ x 36 in.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Lesile, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$17.50-18.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.35-2.50
60-65%	2.60-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron:	
98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum, freight allowed, c.l.	38.50; ton lots 40.50
Antimony, 500-lb lots	42.00*
Brass, 500-lb lots	35.70-52.20†
Bronze, 5000-lb lots	53.50-57.50†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	54.00-58.30†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-55.00
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	20.70-33.90‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr. min, metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, oven	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.75	....	$6.70	$6.60	$7.06
Bar Size Angles	6.45	....	6.40	6.30	6.76
Structural Angles	6.35	....	6.30	6.20	6.66
I-Beams	6.35	....	6.30	6.20	6.66
Channels	6.35	....	6.30	6.20	6.66
Plates (basic bessemer)	6.60	....	6.65	6.55	6.95
Sheets, H.R.	9.50	....	9.45	9.35	9.75
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	11.00	....	10.95	10.85	11.25
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	11.00	....	10.95	10.81	11.25
Sheets, C.R. (drawing quality)	12.00	....	11.95	11.85	12.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.00	....	25.74	25.50	27.12
Barbed Wire (†)	8.25	....	8.20	8.10	8.50
Merchant Bars	6.45	....	6.40	6.30	6.76
Hot-Rolled Bands	9.50	....	9.45	9.35	9.75
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (§)	8.25	....	8.20	8.10	8.50

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max), SM x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lots 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carboram: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c; 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

Scrap Prices Drop $1.50

STEEL's index on No. 1 heavy melting steel falls to $41.33 a ton. Approaching holidays and continued uncertainty over steel labor agreement are influences

Scrap Prices, Page 134

• **Chicago**—Although the market continues weak, prices generally are regarded as nominal, with markdowns limited to a few items. No. 1 industrial heavy melting is off $2 a ton, and No. 1 heavy melting dealer material is off $1.

For the most part, the mills are not buying. Some sales of distress material are reported. Observers think that until the steel dispute is settled the market will drift, even though steelmaking in the district is currently around 95 per cent of capacity. Scrap inventories are ample.

• **Philadelphia**—On the basis of small purchases, open hearth scrap prices have dropped sharply. No. 1 heavy melting is holding at $42, delivered, No. 2 heavy melting at $35, and No. 1 bundles and No. 1 busheling at $46. Also, electric furnace bundles have declined to $49, delivered, machine shop turnings to $23, and heavy breakable cast to $47. Low phos structurals and plates are easy but unchanged at $50-$52, delivered. Railroad specialties remain fairly firm.

• **New York**—With little business anticipated over the rest of this year, brokers' buying prices are easy. They are offering $20-$21 on No. 1 bundles, off $1.

• **Cleveland**—Scrap is moving on old orders, and there has been a little new buying, principally in the Valley. In general, the market is sluggish, and trading is expected to come to a virtual halt over the holiday period. The outlook for January is clouded by the steel labor situation.

• **Pittsburgh** — Higher prices paid for railroad scrap suggest that there may soon be an upward movement in prices on the dealer grades as well. The Pennsylvania sold its No. 1 heavy melting at an average gross price of $50.96, about $4 more than other railroads received earlier in the month. Low phos scrap is up $1 to $55 a ton.

Having sold a lot of bundles recently, dealers are in relatively good position and are disposed to hold out for higher prices on the better grades. The latest purchase of No. 2 bundles by a leading consumer was at $31—not $32 as erroneously reported last week.

• **Detroit**—The market is quiet as dealers and consumers wait out local yearend inventory taxes, which run about $2 a ton. Few consumers are buying. Dealers are trying to move extra tonnage to out-of-state customers. Dealer-to-dealer transactions are being made $2 a ton under published prices.

Traditionally, January experiences a surge in buying as users rush to rebuild inventories, but many dealers and some brokers feel this won't happen next month because users aren't sure about the outcome of the steel wage talks.

• **Buffalo**—The price of No. 1 heavy melting steel has dropped about $2 a ton here in sympathy with declines in the secondary grades of steelmaking scrap, and weakness at other consuming centers. No new business has developed in the No. 1 grade but dealers say the consumer market is no better than $37-$38 on a nominal basis. Prices on low phos, scrap rails, and railroad specialties also are off $2 a ton.

• **Cincinnati**—There's no new buying in the local market, but scrap is moving steadily on old orders. No change in prices is expected until next month. Brokers are still quoting $36-$37 on No. 1 heavy melting steel.

• **St. Louis**—The market is sluggish, the mills buying only small tonnages. There is plenty of material available, and prices continue to slip. Railroad scrap prices are off $1 to $4 a ton. Most dealers and the railroads are waiting to see how the market will go when the steel strike injunction expires next month.

• **Birmingham**—Buying has dropped to a trickle here. The local electric furnace operators announced price reductions last week, but placed no orders. All pipe mills and the only open hearth buyer are out of the market. Some small foundries are buying small lots. Brokers' quotations are down $1 a ton on most grades.

• **Houston**—The market is weaker with demand slow. Major export buyers last week took advantage of the bearishness to reduce their buying prices $1 a ton. Mexican buyers probably will not return to the market until January.

The Lone Star mill is expected to reduce its buying prices for January. The Houston mill may not buy any scrap until February.

Export demand may not be strong enough during the first quarter to keep prices up. Fifty-eight cargoes will be sent to Japan during the period. Twelve will move from the West Coast, 46 will be loaded at East and Gulf ports. Houston

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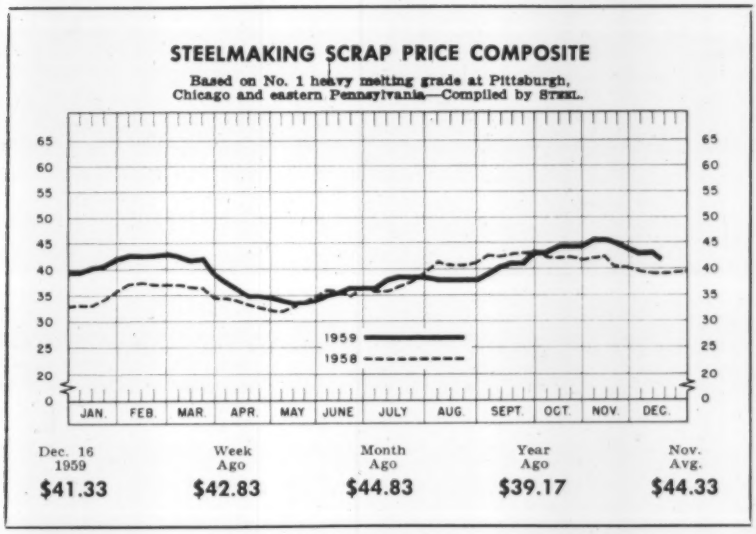

export sources are disappointed by the Japanese requirements. They had expected 81 cargoes to be purchased.

• **Seattle**—Activity in this market is slight. Larger buyers are well stocked and not much scrap is being generated at local yards.

Japan is reported negotiating for first quarter requirements. Only occasional transpacific shipments from the North Pacific area are noted. Schnitzer Steel Products Co., Portland, Oreg., is loading a full cargo for shipment to Japan.

• **San Francisco**—Prices on the chief grades of steelmaking scrap are holding steady. Some mill purchases at $40 are reported.

• **Los Angeles**—Though scrap is moving sluggishly, the $41 price on No. 1 heavy melting steel is holding. There has been some fluctuation in prices for other grades, however. No. 2 heavy melting is quoted at $39, and No. 1 bundles are down $2 to $37.

Structural Shapes . . .

Structural Shape Prices, Page 123

Structural market activity is spotty, but delivery promises are fairly extended due to the scarcity of plain structurals. Some of the larger fabricating shops are quoting five to six months on shipments.

Wide flange sections are particularly scarce, with shipments falling in April on new orders. Standard shapes are not available before late February, and plates not before late March.

The lag in structural contracts reflects seasonal influences and continued uncertainty over the steel labor outlook.

Volume out for estimates in New England is reported slightly improved. This does not include much bridgework, but within the next few weeks, inquiry is expected to pick up, starting with the superstructure for a bridge over the Merrimack River at Lawrence, Mass. A contract for 2000 tons for an auditorium, Prudential Center, Boston, will be closed soon.

Bridgework is outstanding, and fabricators anticipate considerable new business during the first quarter. Texas fabricators have booked 3000 tons for missile launching facilities in eastern Washington. An award of 2000 tons for the Columbia River John Day Dam is pending.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5500 tons, 500,000 kw unit, Colbert steam plant, Alabama, Tennessee Valley Authority, to Ft. Pitt Bridge Works, Pittsburgh.

3000 tons or more, three missile launching bases in central Washington State, reported to Mosher Steel Co.; MacDonald Construction Co., St. Louis, and associates, general contractor.

1515 tons, highway structures, Ponchartrain Blvd., Orleans Parish, Louisiana, to Ingalls Steel Construction Co., Birmingham, 465 tons, and Orleans Materials & Equipment Co., New Orleans, 1050 tons, through Philip

(*Please turn to Page* 139)

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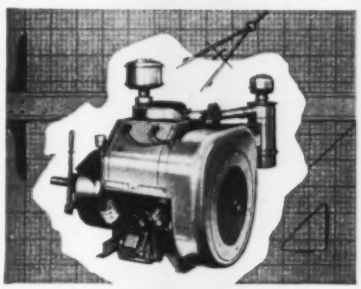

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Dec. 16, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 16	$41.33
Dec. 9	42.83
Nov. Avg.	44.33
Dec. 1958	39.47
Dec. 1954	32.58

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	35.00-36.00
No. 1 dealer bundles	42.00-43.00
No. 2 bundles	*30.00-31.00*
No. 1 busheling	41.00-42.00
No. 2 factory bundles	51.00-52.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Shovel turnings	*30.00-31.00*
Cast iron borings	*30.00-31.00*
Cut structurals:	
2 ft and under	49.00-50.00
3 ft and under	48.00-49.00
Heavy turnings	35.00-36.00
Punchings & plate scrap	*54.00-55.00*
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00-52.00*
Rails, 2 ft and under	*66.00-67.00*
Rails, 18 in. and under	*65.00-66.00*
Random rails	*61.00-62.00*
Angles, splice bars	*56.00-57.00*
Railroad specialties	*58.00-59.00*
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*41.00-42.00*
No. 1 hvy melt., dealer	*39.00-40.00*
No. 2 hvy melting	34.00-36.00
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	40.00-41.00
No. 2 bundles	25.00-27.00
No. 1 busheling, indus.	43.00-44.00
No. 1 busheling, dealer	40.00-41.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	24.00-25.00
Shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals, 3 ft	48.00-49.00
Punchings & plate scrap	50.00-51.00

Cast Iron Grades

No. 1 cupola	54.00-55.00
Stove plate	48.00-49.00
Unstripped motor blocks	46.00-47.00
Clean auto cast	60.00-61.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. malleable	62.00-63.00
Rails, 2 ft and under	59.00-60.00
Rails, 18 in. and under	60.00-61.00
Angles, splice bars	54.00-55.00
Axles	58.00-60.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles, solids	220.00-225.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	39.00-40.00
No. 2 bundles	23.00-24.00
No. 1 busheling	36.00-37.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	14.00-15.00
Shovel turnings	15.00-16.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	40.00-41.00
Heavy breakable	40.00-41.00
Unstripped motor blocks	32.00-33.00
Charging box cast	40.00-41.00
Clean auto cast	53.00-54.00

CLEVELAND

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	33.00-34.00
No. 1 factory bundles	46.00-47.00
No. 1 bundles	42.00-43.00
No. 2 bundles	26.00-27.00
No. 1 busheling	44.00-45.00
Machine shop turnings	16.00-17.00
Shovel turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut foundry steel	42.00-43.00
Cut structurals, plate 2 ft and under	49.00-50.00
Low phos. punchings & plate	45.00-46.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	58.00-59.00
Burnt cast	47.00-48.00
Drop broken machinery	58.00-59.00

Railroad Scrap

R.R. malleable	64.00-65.00
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	59.00-60.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	57.00-58.00
Angles, splice bars	57.00-58.00
Rails, rerolling	74.00-75.00

Stainless Steel

(Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-120.00
430 turnings	45.00-55.00

YOUNGSTOWN

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	36.00-37.00
No. 1 busheling	47.00-48.00
No. 1 bundles	45.00-46.00
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	48.00-49.00
Electric furnace bundles	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00

BUFFALO

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	*37.00-38.00*
No. 2 bundles	27.00-28.00
No. 1 busheling	*37.00-38.00*
Shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos structurals and plate, 2 ft and under	*45.00-46.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	*47.00-48.00*
Rails, 3 ft and under	*53.00-54.00*
Railroad specialties	*45.00-46.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	30.50-31.50
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	36.00-37.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Shovel turnings	22.00-23.00
Cast iron borings	21.00-22.00
Low phos 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	*54.00-55.00*

PHILADELPHIA

No. 1 heavy melting	*42.00*
No. 2 heavy melting	*35.00*
No. 1 bundles	*46.00*
No. 2 bundles	28.00
No. 1 busheling	*46.00*
Electric furnace bundles	*49.00*
Mixed borings, turnings	21.00-22.00†
Shovel turnings	27.00
Machine shop turnings	*23.00*
Heavy turnings	35.00†
Structurals & plates	50.00-52.00
Couplers, springs, wheels	51.00
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grades

No. 1 cupola	45.00
Heavy breakable cast	*47.00*
Drop broken machinery	54.00-55.00
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	*20.00-21.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Shovel turnings	15.00-16.00
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	*35.00-36.00*
No. 1 busheling	*35.00-36.00*
Machine shop turnings	*11.00-12.00*
Shovel turnings	15.00-16.00
No. 1 cast	39.00-40.00
Mixed cupola cast	37.00-38.00
No. 1 machinery cast	40.00-43.00

BIRMINGHAM

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	31.00-32.00
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	40.00-41.00
Cast iron borings	14.00-15.00
Machine shop turnings	*23.00-24.00*
Shovel turnings	*25.00-26.00*
Bar crops and plate	*44.00-45.00*
Structurals & plates	*43.00-44.00*
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	39.00-40.00
2 ft and under	38.00-39.00

Cast Iron Grades

No. 1 cupola	*43.00-54.00*
Stove plate	*53.00-54.00*
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 18 in. and under	*56.00-57.00*
Rails, rerolling	61.00-62.00
Rails, random lengths	*52.00-53.00*
Angles, splice bars	*49.00-50.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	42.00
No. 2 bundles	24.00
No. 1 busheling	42.00
Machine shop turnings	20.00
Shovel turnings	20.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	46.00
Heavy breakable cast	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00*
Rails, 18 in. and under	56.00
Rails, random lengths	*50.00*
Rails, rerolling	65.00
Angles, splice bars	50.00

HOUSTON

(Exporters' buying prices; f.a.s)

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*36.00-37.00*
No. 2 bundles	26.50-27.50

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Shovel turnings	20.00
Low phos. plates & structurals	48.00

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Heavy breakable	35.00
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy meting	41.00
No. 2 heavy melting	*39.00*
No. 1 bundles	*37.00*
No. 2 bundles	*21.00*
Machine shop turnings	18.00
Shovel turnings	*18.00*
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

(Brokers' buying prices)

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	36.00-38.00
No. 1 bundles	36.00
No. 2 bundles	25.00-26.00
Shovel turnings	22.00
Electric furnace bundles	42.00-44.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	35.00
Unstripped motor blocks	31.00
Stove plate	21.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00-33.00
No. 1 bundles	32.00-33.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

SAN FRANCISCO

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

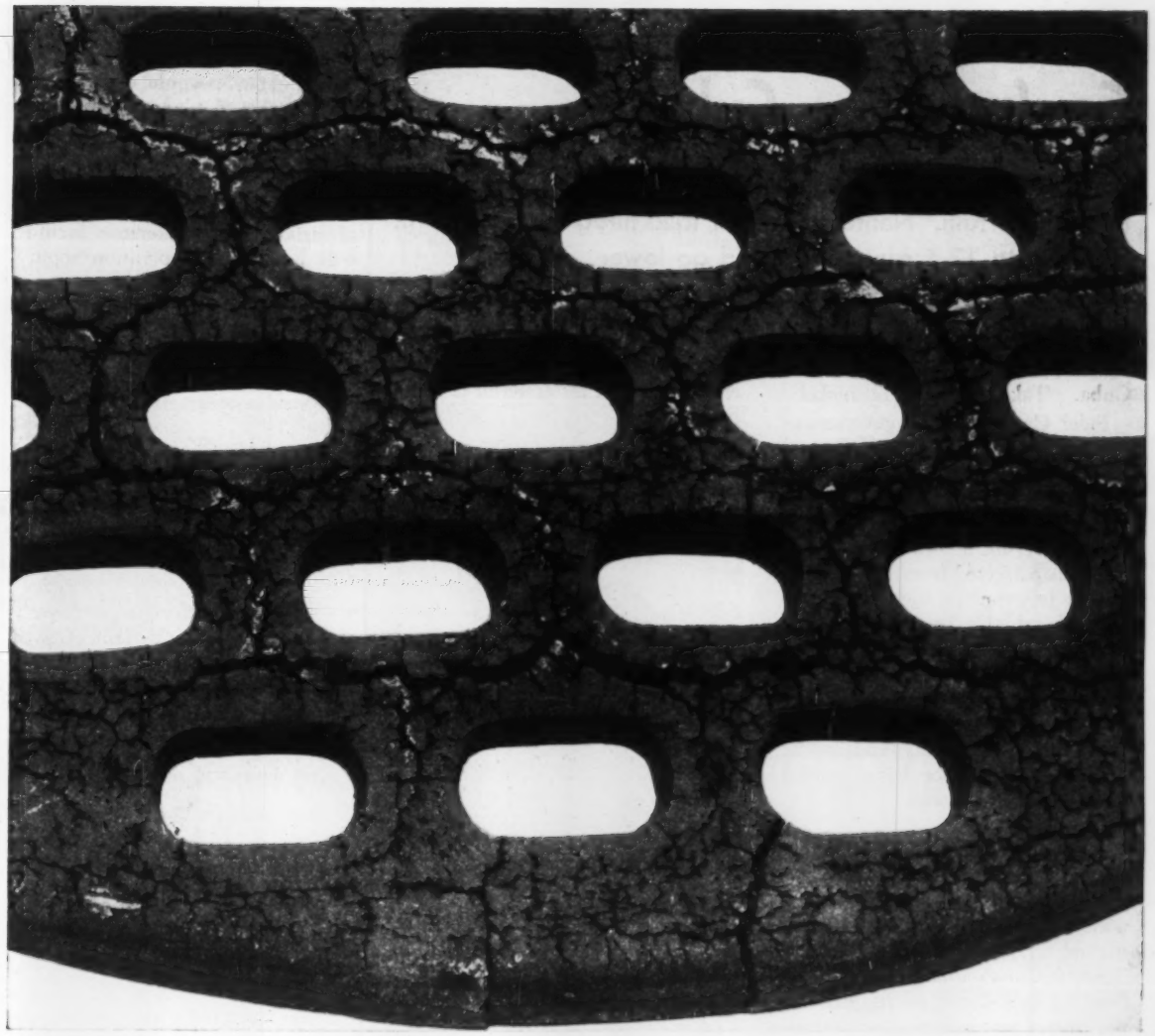
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades†

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.



This is THERMAL FATIGUE

This photograph shows a heat-resistant alloy casting after thermal-fatigue failure.

Thermal fatigue begins with cyclical heating and cooling which produces alternate expansion and contraction. The shape of the casting hinders this expansion and contraction. As a result, hindered expansion and contraction stresses develop and increase until plastic flow occurs. This plastic flow produces a network of thermal-fatigue cracks and this cracking leads to failure.

Thermal fatigue is an inherent problem in heat-resistant castings. As such, it occupies an important place in Electro-Alloys research efforts to lengthen life of components working under high temperatures and severe cyclical conditions.

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Confusion in Cuba

Confiscatory taxes on American nickel interests make their future uncertain. Nonferrous labor talks head for showdown. Lead cut to 12.5 cents and could go lower

Nonferrous Metal Prices, Pages 138 & 139

TROUBLE in large doses is being served up to American industry in Cuba. Take the case of nickel:

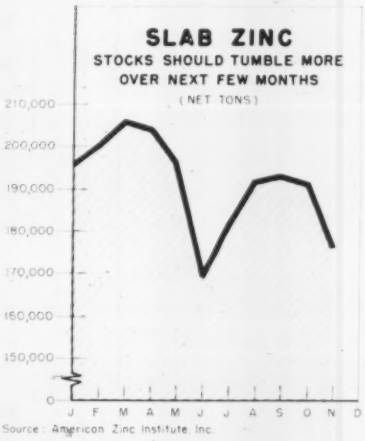
Fidel Castro's leftist government has slapped taxes on the metal that are nothing short of confiscatory. For example, a firm in the nickel business has to pay a 5 per cent tax on the value of all minerals extracted from the ground, plus a levy on all the ores on its property whether or not they're being worked. Even worse: When a company ships nickel metal, ores, or concentrates from Cuba it has to pay an export tax equal to 25 per cent of the value of the material, at the highest market price being quoted anywhere in the world.

• **Nationalization Goal?**—Many observers believe that the Castro government's ultimate objective is nationalization of all industry—including mining, oil, cattle, and sugar. To date, Cuba's almost hysterical refusal to back down on the extreme tax measures indicates something more than a search for revenues—perhaps a desire to drive the bulk of American interests from the island.

Castro's pounce on the nickel industry could be a severe blow to Freeport Sulphur Co., which recently completed a $119 million nickel-cobalt complex that includes mines and ore concentrating facilities in Cuba and a refinery at Port Nickel, La. Bethlehem Steel Co., which controls large ore bodies on the island, is also affected by the new tax structure.

• **Nicaro's Fate Unknown**—Tied up in the mess is the fate of the U. S. government owned nickel mining and processing complex at Nicaro, Cuba.

No one seems to be sure how the new tax laws will affect Nicaro. The Cubans reportedly feel the operation should pay. The U. S. feels it is protected under prior agreements. The situation's murky enough so that no material is being shipped out from the plant. But there are large stocks of Nicaro material in the U. S.



• **The Puzzle Broadens**—One of the strangest developments in the whole situation is Cuba's recently declared interest in acquiring Nicaro. (One rumor has it that Castro might be inclined to a long term trade deal with the Russians, who are known to be nickel-short.) Observers say it is highly unlikely that the U. S. would consider selling Nicaro to Cuba at this time.

On the Labor Scene

Odds are still good that the bulk of strikebound nonferrous facilities will be back in operation soon:

• American Smelting & Refining Co. has started up operations at its 13 copper and lead facilities as a result of union ratification of a new two year contract (see STEEL, Dec. 7, p. 214).

• Kennecott Copper Corp. and the Mine-Mill Union still haven't come to terms. Main stumbling block: The union's reluctance to O.K. a "no strike" clause.

• Aluminum negotiators expect to work out an early settlement without any major hitches appearing—probably before the holidays. Work rules are not an issue.

Lead Price Cut

The price of lead was cut by 0.5 cent to 12.5 cents a pound on Dec. 14 as expected. The market has been consistently weak for some time and the re-entry of Asarco as a major supplier (due to its strike settlement) means even more lead on the glutted market. The custom smelter which initiated the price drop was undoubtedly influenced by the oversupply situation and preferred to accumulate concentrates at the 12.5 figure instead of at 13 cents.

It's highly likely the lead price could take another early fall, probably by 0.5 cent a pound.

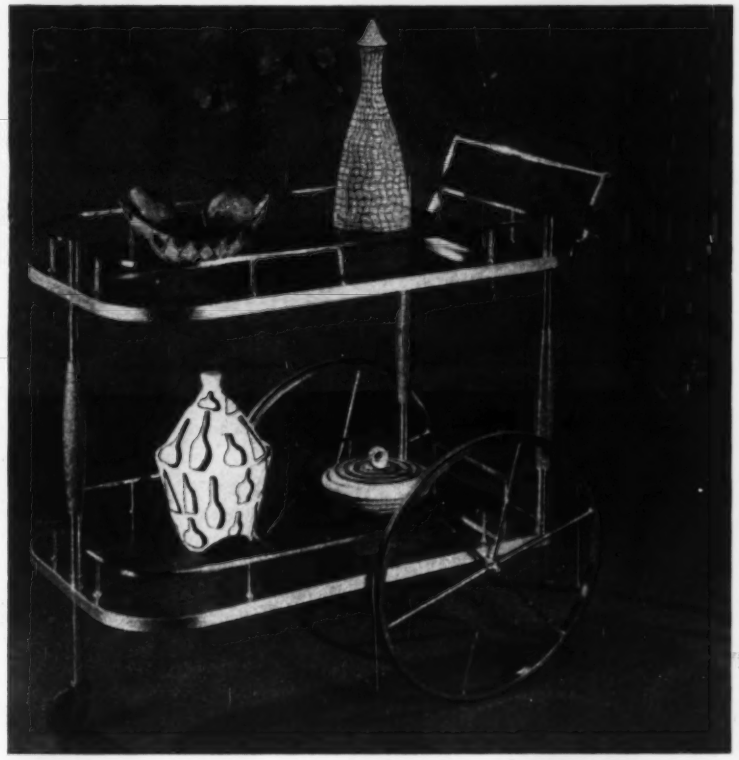
NONFERROUS PRICE RECORD

	Dec. 16 Price	Last Change	Previous Price	Nov. Avg	Oct. Avg	Dec., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	33.00	Nov. 12, 1959	31.50	32.420	31.278	28.856
Lead	12.30	Dec. 14, 1959	12.80	12.800	12.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	98.875	Dec. 16, 1959	98.75	100.985	102.231	99.019
Zinc	12.50	Nov. 2, 1959	12.50–13.00	12.500	12.259	11.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

Furniture Manufacturers Call it

"BRIDGEPORT FREE-ER MACHINING BRASS ROD"



Manufacturers of a wide variety of products find Bridgeport Free Machining Brass Rod eminently suited to their items—from both a production and beauty point of view. Furniture manufacturers are but one successful example.

The production steps involved in manufacturing such furniture are frequently numerous and complex. For example, a solid brass tea cart such as shown here may represent some ten or more separate production steps. These include cutting, bending, drilling, tapping, twisting, polishing and lacquering, most of which are done on high-speed automatic equipment. The objective here, as with any screw machine operation, is high *uninterrupted* speeds. An increasing number of manufacturers are achieving these uninterrupted speeds with Bridgeport rod and tubing of various shapes and sizes. They find, on a comparative basis, that the high quality of Bridgeport Free Machining Brass is *constant* and can be depended on from end to end.

Bridgeport Free Machining Brass is but one of the many "easy-does-it" metals that are standard stock and immediately available from nearby Bridgeport Warehouses. An inquiry to your local Bridgeport Sales Office may lead to improving your product, increasing your production rate and raising your profits. Call today!

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY

Bridgeport 2, Connecticut • Sales Offices in Principal Cities

Specialists in Metals from Aluminum to Zirconium

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.40 per lb deld.

Cobalt: 99+ %, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, nom.; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.30; chemical, 12.40; corroding, 12.40, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75 del.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $215-217 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz npm.

Palladium: $22-24 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 98.875.

Titanium: Sponge, 99.3+ % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+ % hydrogen reduced, $3.00-3.80.

Zinc: Prime western, 12.50; brass special, 12.75; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 13.75; special high grade, 14.00 deld. Diecasting alloy ingot No. 3, 15.75; No. 2, 16.25; No. 5, 16.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.50; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lot, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.00 per cwt; pipe, full coils, $18.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.85
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.530	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¼ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheets and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .061 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-48	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.75-25.25; No. 2 heavy copper and wire, 21.75-22.25; light copper, 20.25-20.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 16.00-16.50; light brass, 12.25-12.50; heavy yellow brass, 13.25-13.75; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.75-16.20.

Lead: Soft scrap lead, 8.00-8.50; battery plates, 3.50-3.75; linotype and stereotype, 9.50-10.00; electrotype, 7.75-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 29.00-31.00; old sheets, 25.00-27.00; turnings, 20.00-22.00; rods, 29.00-31.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.25-4.75; new diecast scrap, 4.00-4.25; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.25-16.75; segregated high copper clips, 15.50-16.00; mixed low copper clips, 15.50-16.00; mixed high copper clips, 15.00-15.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 26.50; light copper, 23.00; refinery brass (60% copper) dry copper content, 24.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 25.50; light copper, 23.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.40.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50, 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 19.75; flat tops, 19.75; flats, 22.50; ovals, 21.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5,900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (Anhydrous): 25 lb, 153.20; 100 lb, 148.30; 400 lb, 145.90; 800-19,900 lb, 105.00; 20,000 lb or more, 98.90.

Stannous Sulphate: Less than 50 lb, 138.40; 50 lb, 108.40; 100-1900 lb, 106.40; 2000 lb or more, 104.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 133)

R. Farnsworth & Co., New Orleans, general contractor.

1485 tons, addition, Federal Reserve Bank, Atlanta, to Ingalls Steel Construction Co., Birmingham, through Batson Cook Co., West Point Ga., general contractor.

1115 tons, Nassau County executive building, Garden City, N. Y., through Estanga & Son, general contractor, to Grand Iron Works, Bronx, New York.

1000 tons or more, steam electric generating plant, South Carolina Electric & Gas Co., Canadys, S. C., to Kline Iron & Metal Works, Columbia, S. C.

1000 tons or more, locks and dam, Pike Island, Ohio River, Ohio-West Virginia, U. S. Engineer, Pittsburgh, to Dravo Corp., Pittsburgh, $22,868,706.

847 tons, 18 transmission towers, for Consolidated Edison Co. at Buchanan, N. Y.; one of two contracts going to American Bridge Div., U. S. Steel Corp., Pittsburgh, and the other going to Lehigh Structural Steel Co., Allentown, Pa.

800 tons or more, tower steel, to Societa Anonima Electrificacione, Milan, Italy, at $242,415 by Bonneville Power Administration, Portland, Oreg.

593 tons, steel H-piles, Tennessee Coal & Iron Div., U. S. Steel Corp., Birmingham.

465 tons, line plant, Kennecott Copper Co., Hayden, Ariz., to Allison Steel Mfg. Co., Phoenix, Ariz.

195 tons, state bridgework, FASS 59-20, Ulster County, New York, through Shanahan Construction Co. to the Ernst Steel Corp., Buffalo.

116 tons, four-span composite wide flange beam bridge, Pittsford, Vt., to Vermont Structural Steel Co., Burlington, Vt., through William L. Lyon, North Field Falls, Vt., general contractor; 45 tons of reinforcing bars to the Truscon Steel Div., Republic Steel Corp., Boston.

STRUCTURAL STEEL PENDING

14,000 tons, Balboa Bridge, Panama Canal, J. F. Bradley, erector, Chicago, low on an alternative involving foreign steel; American Bridge Div., U. S. Steel Corp., Pittsburgh, second low bidder.

3000 tons, U. S. Court House and federal office building, Brooklyn, N. Y.; bids close Dec. 22.

2200 tons, city auditorium, Prudential Center, Boston; bids in.

2000 tons or more, John Day Dam, Columbia River; bids in.

1530 tons, gates and other structures, power project, Niagara, N. Y., for the New York State Power Authority.

1500 tons (estimated), powerhouse, Unit No. 2, Portland, Pa., for the Metropolitan Edison Co., Reading, Pa.; bids to be opened shortly.

1340 tons, Cardinal Spellman High School, Bronx, New York.

923 tons, two contracts, General Stores Supply Office, Navy, Philadelphia, bids Dec. 28; also, 180 tons of wide flange beams, bids Dec. 29.

750 tons, 12 buildings, mental hospital, State Department of Public Works, West Seneca, N. Y.; bids asked.

500 tons, toll bridge, Contract No. 1, McKinley, Ill.; bids Jan. 7.

475 tons, Baxtes warehouse and office building, Union, N. J., A. A. La Fountain, Hackensack, N. J., low on the general contract.

435 tons, merchandise building, Western Electric Co., at Baltimore; pending.

400 tons, Children's Court, Department of Public Works, New York, at East Meadows, N. Y.; bids asked.

385 tons, Martle-Newtown Junior High School, near Philadelphia, Frank M. Weaver & Co., Lansdale, Pa., low bidder; financing to be arranged.

270 tons, factory building, Singer Sewing Machine Co. at Syosett, N. Y.; pending.

240 tons, state bridgework, Burlington County, New Jersey, Harbor Construction Co., Branford, Conn., low on the general contract.

120 tons, two wide flange beam bridges, Newport-Troy, Vt.; Ralph Goodrich Inc., South Burlington, Vt., low on the general contract.

100 tons, including reinforcing, Cedar River bridge and approaches; Troy T. Burnham, Seattle, low at $103,043 to Renton, Wash.

Unstated, steel frame, liquid oxygen plant (also tanks), Fairchild Air Base, Spokane, Wash.; Sound Construction & Engineering Co., Seattle, low at $357,000 to the U. S. Engineer, Seattle.

Unstated, Washington State, 1622 ft Pioneer Bridge, Cowlitz River; bids to be called about Mar. 1.

Unstated, 558 ft Yellowstone River bridge, and 1125 ft Missouri River bridge, Great Falls, Mont.; state project; bids to be called probably in January.

REINFORCING BARS . . .

REINFORCING BARS PLACED

755 tons, highway structures, Ponchartrain

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ELECTRICAL ENGINEER

Graduate Electrical Engr.

with experience—**STEEL PLANT EQUIPMENT** and **CONSTRUCTION** desired for Venezuelan Steel Plant.

Forward resume of experience, education & salary requirements in confidence to:—

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TWO EXPERIENCED MEN selling to steel producing industry are interested in adding one or two lines of equipment sold to this field. Located in Cleveland. Reply Box 811, STEEL, Penton Bldg., Cleveland 13, Ohio.

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METALLURGICAL ENGINEER with at least 5 yrs. experience in wire drawing of stainless steels & related alloys needed by mfr. in northern New Jersey area. Send complete record to Box 816, STEEL, Penton Bldg., Cleveland 13, Ohio.

WIRE DRAWING FOREMAN wanted by firm manufacturing stainless steel & nonferrous wire, located Newark, N. J. area. Address reply to Box 809, STEEL, Penton Bldg., Cleveland 13, Ohio.

ROLLING MILL SUPERINTENDENT
Outstanding immediate opportunity and excellent future in steel division of leading corporation nearing completion of first phase of long range expansion program. Must be thoroughly experienced in semi-continuous and hand merchant bar mill operation. Reply Box 814, STEEL, Penton Bldg., Cleveland 13, Ohio.

COLD ROLLING FOREMAN for non-ferrous & stainless wire mfr. located northern New Jersey area. Send reply to Box 810, STEEL, Penton Bldg., Cleveland 13, Ohio.

METALLURGICAL ENGINEER in Newark, N. J. area with at least 5 yrs. experience cold rolling of stainless steels & related alloys. Send complete record to Box 812, STEEL, Penton Bldg., Cleveland 13, Ohio.

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CHIEF ESTIMATOR—Extensive experience with Los Angeles fabricator of pressure vessels, machinery and miscellaneous plate. Write Box 815, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Steel Structures Equipment Co.
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Blvd., Orleans Parish, Louisiana, to Laclede Steel Co., St. Louis, through Philip R. Farnsworth & Co., New Orleans, general contractor.

240 tons, addition, Federal Reserve Bank, Atlanta, to Connors Steel Div., H. K. Porter Company Inc., Birmingham, through Batson Cook Co., West Point, Ga., general contractor.

67 tons, warehouse, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Fred S. Jones, Seattle, general contractor.

REINFORCING BARS PENDING

8850 tons, John Day Dam, Columbia River; bids in.

1340 tons, Washington State, Ravenna Avenue freeway bridges, Seattle, three spans; general contract to MacRae Bros. Construction Co., Seattle, low at $2,330,334.

545 tons, highway bridges, Natchez Trace Parkway, Claiborne County, Mississippi; bids Jan. 7, U. S. Bureau of Public Roads, Florence, Ala.

175 tons, two steel beam bridges, contract No. 2, Northfield-Tilton, N. H.; Constructors Inc., Lexington, Mass., low on the general contract; also 130 tons of steel bearing piles.

100 tons or more, 563 ft Siuslaw River bridge; Tom Lillebo, Reedsport, Oreg., low at $245,202 to the Bureau of Public Roads, Portland, Oreg.

Unstated, Montana state highway projects, bids to Helena, Mont., Feb. 17; grade separations in Silver Bow County, bridges in Roosevelt, McCone, and Yellowstone Counties.

Unstated, Oregon state highway projects, awards to be made Dec. 16: Jackson County, Rogue River bridge, Pacific Concrete Co. and Otis P. Jordan Jr., Portland, Oreg., joint low at $603,333; Josephine County, Grants Pass overcrossing, Ausland Construction Co., Grants Pass, Oreg., low at $95,585; Lane County, railway overpass, Sig. Anderson, Coos Bay, Oreg., low at $165,070. Smaller projects in Lincoln, Linn, and Jackson Counties.

Unstated, physical education building, Western Washington College, Bellingham, Wash.; Elford Construction Co., Bellingham, low at $868,500.

Unstated, also miscellaneous steel items, siphons and structure, Rogue River, Oregon, project; A. R. Sime, Kennewick and Glen A. Pegram, Othello, Wash., low at $210,020 to the U. S. Bureau of Reclamation, Camp White, Oreg.

PLATES . . .

PLATES PLACED

1600 tons, composite piling for Yankee Dam, Thailand, to Pacific Car & Foundry Co., Seattle.

545 tons, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

347 tons, General Stores Supply Office, Navy, Philadelphia, to C. Itoh & Co. Inc., New York.

PLATES PENDING

9507 tons, General Stores Supply Office, Navy, Philadelphia, nine contracts: 8521 tons, carbon; 711 tons, alloy, and 275 tons, floor plates; bids Dec. 22; also, 2075 tons, sheets, five contracts: 1325 tons, carbon; 528 tons, stainless, and 222 tons, corrugated—total 11,582 tons.

100 tons, Naval shipyard, Portsmouth, N. H.; bids Jan. 4, to the Navy Supply Office.

RAILS, CARS . . .

RAILROAD CARS PLACED

Trailer Train Co., 500 eighty-five-foot roller bearing flatcars for piggyback service, 300 going to the Pullman-Standard Div., Pullman Inc., Chicago, and 200 to the Bethlehem Steel Corp. plant at Johnstown, Pa.

RAILROAD CARS PENDING

U. S. Army Transportation Command, St. Louis, ten 70-ton hoppers and 16 fifty-ton flatcars; bids in January.

Advertising Index

Allegheny Ludlum Steel Corporation 112
Aluminium Limited Sales, Inc. 70
Aluminum Company of America 29
American Brake Shoe Co., Electro-Alloys Division 135
American Chain & Cable Co., Inc., Page Steel & Wire Division 107
American Optical Co., Safety Products Division 12
American Steel & Wire Division United States Steel Corporation 8, 9
Armco Steel Corporation 46
Associated Spring Corporation 35

Baker, J. E., Co., The 98
Baldwin-Lima-Hamilton Corporation, Standard Steel Works Division 122
Barnes, Wallace, Co., Ltd., The, Subsidiary of Associated Spring Corporation 35
Barnes, Wallace, Division, Associated Spring Corporation 35
Barnes, Wallace, Steel Division, Associated Spring Corporation 35
Basic, Inc. 40
Bay State Abrasive Products Co. 14, 15
Bethlehem Steel Co. 1, 17, 18, 19, 20
B-G-R Division, Associated Spring Corporation .. 35
Bridgeport Brass Co. 137
Bristol Brass Corporation, The 97
Bullard Co., The 66

Carpenter Steel Co., The 3
Cattie, Joseph P., & Brothers, Inc. 132
Chambersburg Engineering Co. 30
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 93
Colorado Fuel & Iron Corporation, The 39
Columbia-Geneva Steel Division, United States Steel Corporation 8, 9
Crown Zellerbach Corporation, Gaylord Container Corporation Division 37
Cutler-Hammer, Inc. ..... Back Cover

De Laval Steam Turbine Co. 110
Dunbar Brothers Division, Associated Spring Corporation 35

Electric Controller & Mfg. Co., The, A Division of The Square D Co. ..... Inside Front Cover
Electro-Alloys Division, American Brake Shoe Co. 135
Erie Forge & Steel Corporation 84
Ex-Cell-O Corporation 6
Ex-Cell-O Corporation, Machinery Division .. 7

Gaylord Container Corporation, Division of Crown Zellerbach Corporation 37
General Electric Co. 21
General Electric Co., Metallurgical Products Department 38
Gibson, William D., Division, Associated Spring Corporation 35

Hayes, C. I., Inc. 73
Hyde Park Foundry & Machine Co. 141

Ingersoll-Rand 26
Inland Steel Co. 45
International Business Machines 83

Jones & Lamson Machine Co. 118
Jones & Laughlin Steel Corporation, Stainless & Strip Division 80

Kidde, Walter, & Co., Inc. 102

McKay Machine Co. 60
McKee, Arthur G., & Co. 79

Malleable Castings Council 22, 23
Manross, F. N., & Sons Division, Associated Spring Corporation 35
Metallurgical Products Department of General Electric Co. 38

Miller Electric Manufacturing Co., Inc. 115
Milwaukee Division, Associated Spring Corporation 35
Morgan Construction Co. 59

National Acme Co., The 32, 33
National Steel Corporation 27

Ohio Division, Associated Spring Corporation 35
Ohio Knife Co., The 95
Osborn Manufacturing Co., The 106

Page Steel & Wire Division, American Chain & Cable Co., Inc. 107
Pangborn Corporation ..... Inside Back Cover

Ramseyer & Miller, Inc. 139
Raymond Manufacturing Division, Associated Spring Corporation 35
Reliance Electric & Engineering Co. 34
Republic Steel Corporation 24, 25
Revere Copper & Brass, Inc. 105
Robbins & Myers, Inc., Hoist & Crane Division 36
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 39
Rolled Alloys, Inc. 72
Ryerson, Joseph T., & Son, Inc. 48

Seaboard Pacific Division, Associated Spring Corporation 35
Shepard Niles Crane & Hoist Corporation 117
SKF Industries, Inc. 2
Square D Co., The, The Electric Controller & Mfg. Co. Division ..... Inside Front Cover
Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation 122
Surface Combustion Corporation 13

Tempil Corporation 16
Tennessee Coal & Iron Division, United States Steel Corporation 8, 9
Texaco, Inc. 28
Thompson, Henry G., & Son Co., Milband Machine Tool Division 77
Tinnerman Products, Inc. 74
Tube Methods, Inc. 116

Ulbrich Stainless Steels 119
Union Carbide Corporation, Union Carbide Metals Division 11
Union Carbide Metals Co., Division of Union Carbide Corporation 11
United Engineering & Foundry Co. 109
United States Steel Corporation, Subsidiaries 8, 9
United States Steel Export Co. 8, 9

Vanadium Corporation of America 131
Veeder-Root, Inc. 4

Wales Strippit, Inc. 10
Ward Steel Co. 116
Washington Steel Corporation 114
Wean Equipment Corporation 69
Weirton Steel Co. 27
Westinghouse Electric Corporation 62, 63
Wheland Co., The 116
Wisconsin Motor Corporation 133
Wyckoff Steel Co. 140

Yawata Iron & Steel Co., Ltd. 142
Youngstown Sheet & Tube Co., The 31

~ ~ ~

Table of Contents
Facing Inside Front Cover

Classified Advertising, Page 139

RED CIRCLE
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For more than 50 years Hyde Park Steel Mill equipment has been helping American industry lead the world — equipment such as—
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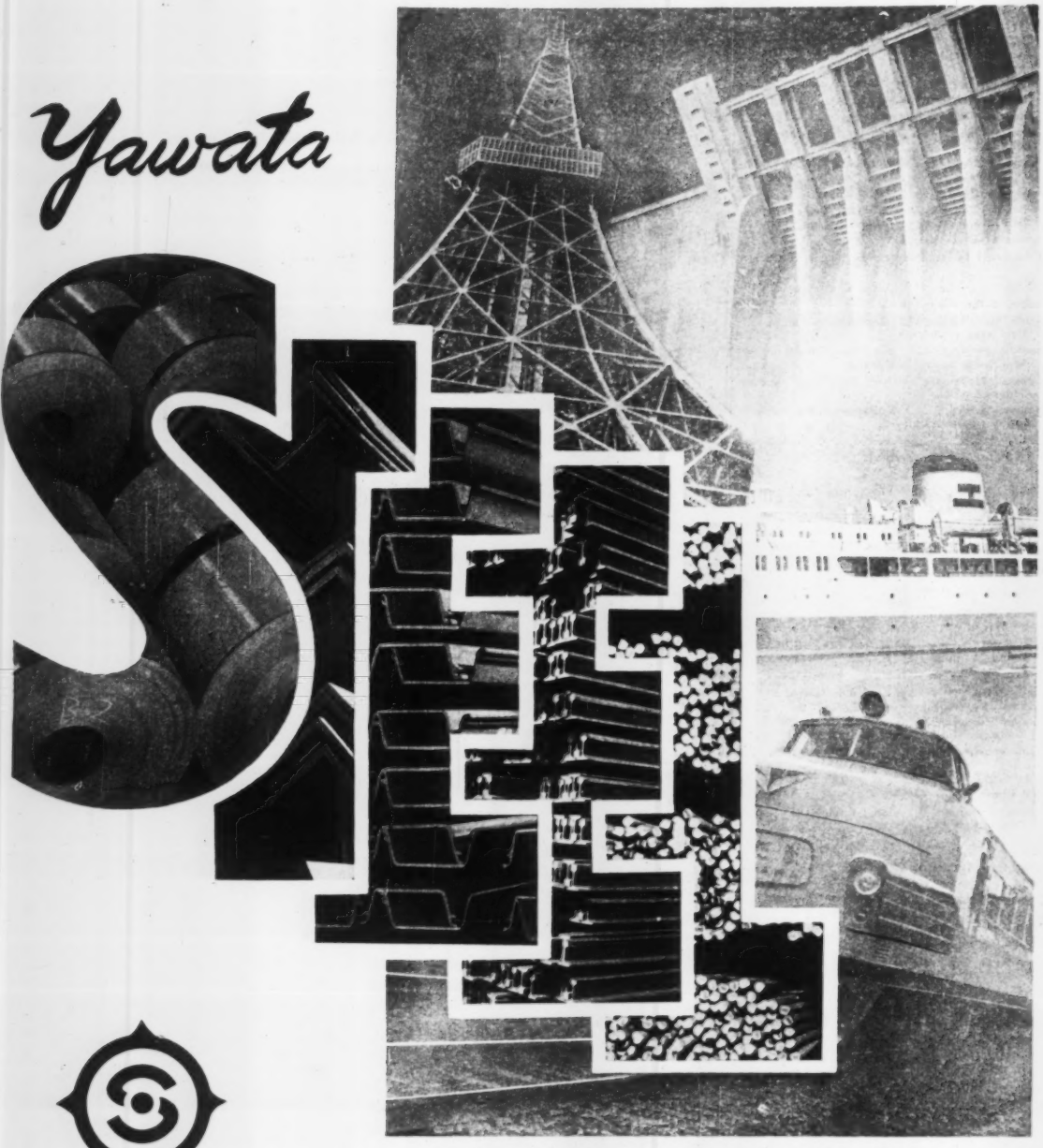

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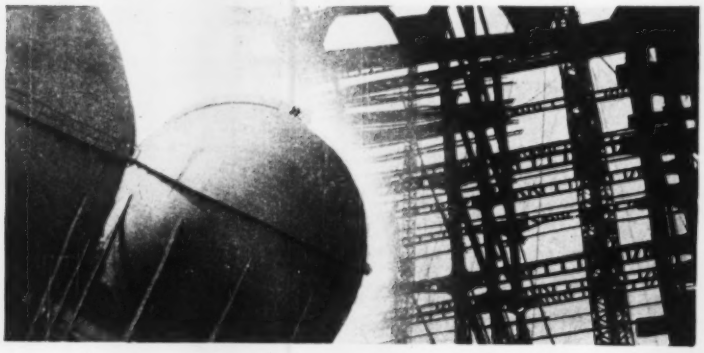
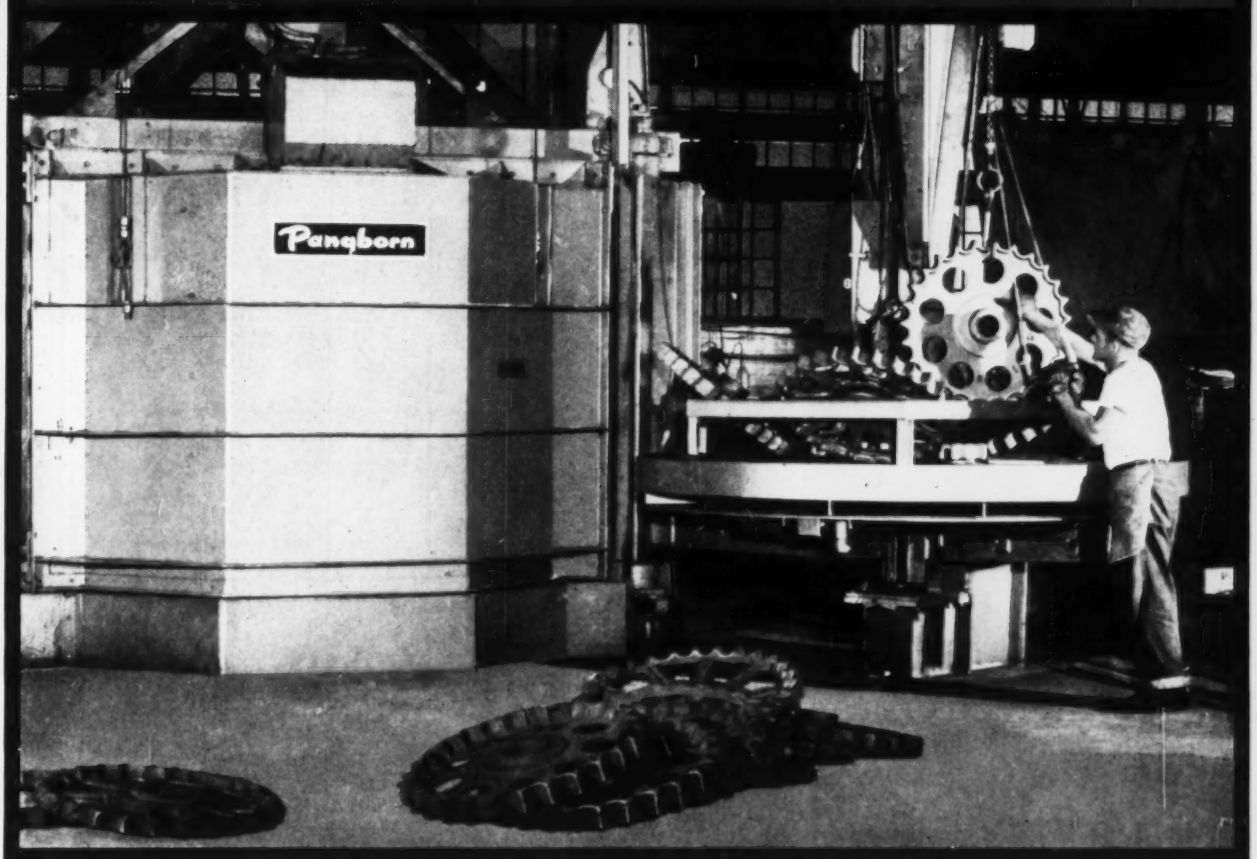


DOUBLES CLEANING CAPACITY!



Pangborn Table Room does twice the work at Harrison Steel Castings!

Two basic features of the new Pangborn "LM" Table Room at Harrison Steel Castings Co., Attica, Ind., explain the firm's doubled capacity in the cleaning department.

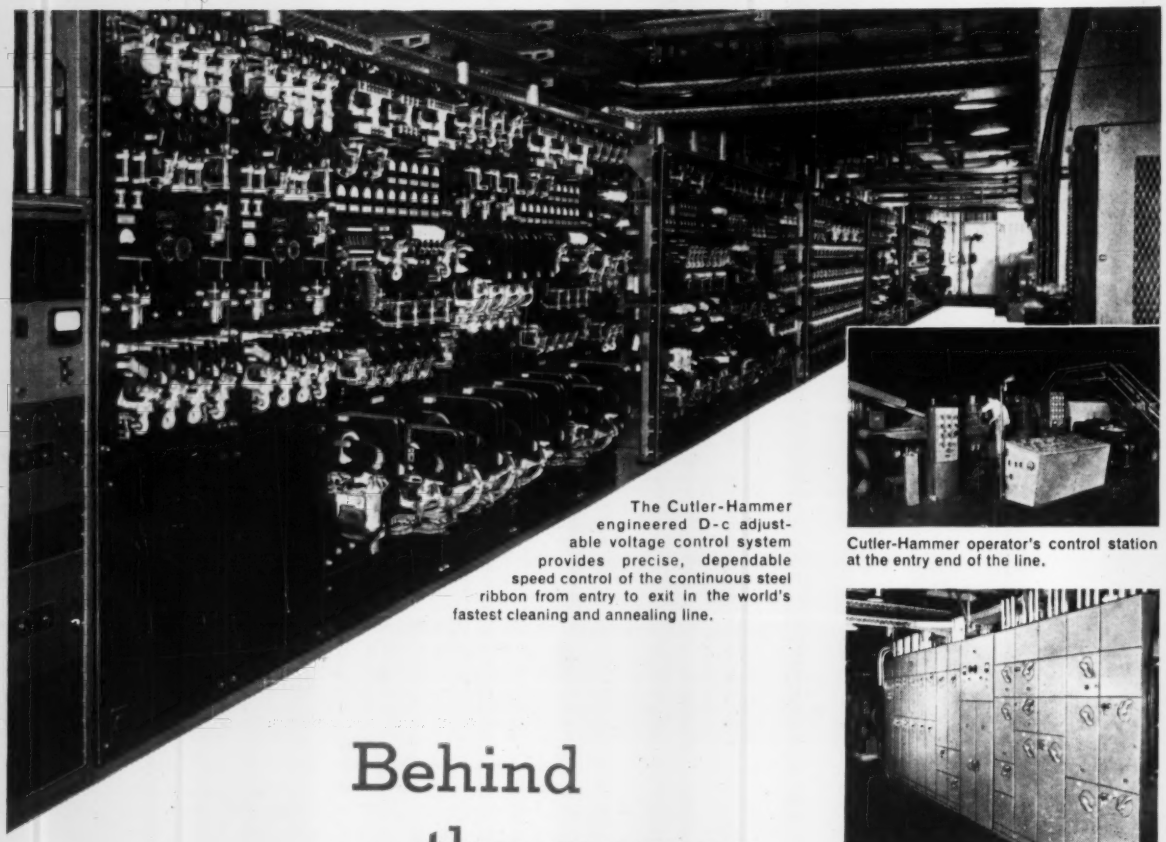
First: *Twin* work tables—one rotating in the blast cabinet while the other is reloaded—clean pieces up to 8′ diameter continuously. These tables handle smoothly . . . are easily pushed by hand. Their weight while loading is supported by a stationary floor pedestal (rather than door hinges) for long life and trouble-free operation.

Second: The "LM" Table Room utilizes two Rotoblast wheels throwing a total of 100,000 lbs. of abrasive per hour. The result is a tremendous concentration of blast power for quick cleaning . . . positioned for complete, thorough work coverage.

The cleaning speed and operating ease of the Pangborn Table Room have proved the value of this machine at Harrison Steel Castings. If *you* must maintain production schedules in cleaning large, awkward or heavy pieces, send for Bulletin 805. Write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.*

Pangborn

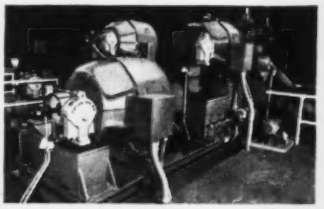
Cleans it fast with ROTOBLAST®



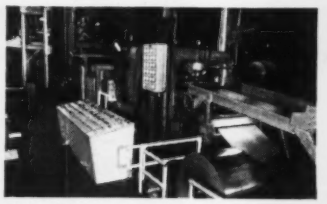
The Cutler-Hammer engineered D-c adjustable voltage control system provides precise, dependable speed control of the continuous steel ribbon from entry to exit in the world's fastest cleaning and annealing line.

Cutler-Hammer operator's control station at the entry end of the line.

Cutler-Hammer Unitrol provides a convenient, space-saving unit for all A-c auxiliary controls.



Cutler-Hammer 505 Mill Brakes are used on the winding reels and bridle stands.



Cutler-Hammer operator's control station at the exit end of the line.

Behind the scenes at Weirton Steel...

Cutler-Hammer Control keeps the world's fastest continuous cleaning and annealing line on the go

The new continuous strip steel cleaning and annealing line at the Weirton Steel Company division of National Steel Corporation is truly a remarkable engineering achievement. It automatically cleans and anneals an endless ribbon of cold rolled steel at speeds up to 2,000 feet per minute . . . a new world's record. But of equal importance is the fact it can deliver 20,000 tons of steel ready for tin plating every month.

Unquestionably, a processing line such as this represents a major capital investment which must pay for itself through high speed, dependable production day after day . . . month after month . . . year after year. And to a great extent its successful operation depends upon the trouble-free performance of the control equipment which integrates and regulates the complex system of individual machines that go to make up the line.

Here Cutler-Hammer's 65 years of control engineering experience provided the expert "know-how" in designing the *right* control system, the *dependable* control system for this performance champion.

You too will find it pays to work with Cutler-Hammer for the practical solution to all your mill control problems. Your inquiry will receive prompt attention. Write Department Z213, Cutler-Hammer Inc., Milwaukee 1, Wisconsin.

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